THE

AMERICAN JOURNAL OF PHARMACY.

SEPTEMBER, 1867.

PHARMACEUTICAL NOTES.

By C. Lewis Diehl.

Lead Plaster.—The formula of our Pharmacopœia directs that the litharge be sifted into the oil, boiling water added, and the mixture boiled until a plaster is formed, with occasional addition of water. When this direction is followed, it is almost impossible to obtain a plaster perfectly free from uncombined litharge, and I do not believe that it is followed by manufacturers on a large scale. I have prepared the plaster frequently during the past three or four years, and invariably succeeded in obtaining a handsome plaster, entirely free from uncombined litharge, by first rubbing the sifted litharge with about half its weight of oil, stirring this mixture into the remainder of the oil, contained in a tinned copper kettle, adding the water, and heating to above 212° F., until a uniform plaster was formed, which occupied from one to two days. It is not necessary to boil the plaster, which, requiring the application of direct heat, is apt to burn it, and therefore requires constant attention. I generally prepared it in a steam kettle, under a pressure of ten pounds of steam, and do not think that the temperature ever rose above 230° F. Its manufacture in small quantities may be conducted on a chloride of zinc bath, and the process requires but occasional stirring and renewal of the water as it evaporates. It is true that when direct heat is employed,

the plaster is finished in a shorter time; but this is fully compensated by the little attention required, and the improved quality of the product. A. Graf, in a late number of "Buchner's Repertorium," advocates a similar process, which requires, however, that the mixed litharge and oil be added to the remainder of the oil previously heated; this preliminary heating, in my experience, is not necessary.

Soap Plaster.—In preparing this plaster, the soap is rubbed with water to a semifluid consistence, and then stirred into the melted plaster. It is difficult, however, to rub the soap up perfectly and rapidly, and I therefore found it convenient to strain the mixture, obtained by triturating the soap with its weight of water, through coarse muslin, and to reduce the residue with a proportionate amount of water, before stirring it into the plaster. This procedure insures a perfectly smooth, uniform plaster. It may seem trifling to draw attention to so insignificant a matter; but these little advantages frequently save much trouble, for which reason it is here noted.

Oil of Turpentine.—A short time ago, I received from a wholesale firm in this city a sample of oil of turpentine, which was of a pale green color, evidently contained copper, and was consequently unfit for sale. I am informed that this is not an isolated case, but that oil in a similar condition has been met with before. The copper was readily removed by shaking the oil with a small amount of a saturated solution of prussiate of potash, and allowing it to rest for two to three days, when it was drawn off clear.

Syr. of Phosph. of Iron, Quinia and Strychnia, so highly recommended by Drs. Aitken and Lyons as a powerful tonic combination, has of late come into considerable use in this city, but unfortunately is very unstable. Several of our leading pharmacists, who prepared the syrup according to the formula published in A. J. Ph., March, 1867, p. 177, and manipulated as suggested by Mr. Chas. Bullock, found that in a short time it deposited a white precipitate, and soon became dark-colored. I have not given the subject sufficient attention to point out a reliable means of avoiding this, but would suggest that the syrup be

filled, as soon as finished, in small, well-corked vials, covered with blue paper, so as to exclude light and atmospheric air. I am inclined to think that this will prevent change, from the fact that some of the syrup which had been wrapped and corked securely, and placed on the shelf for sale, remained unchanged during the time in whieh a portion of the same lot, exposed to light in a loose-stoppered bottle, had formed a deposit and became darkened.

The precipitate formed was examined, and found to consist of phosphate of iron; it was feared at first that a portion of the quinia or strychnia was also precipitated, but this was negatived by appropriate tests.*

Adulterated Oil of Lemon.—Preparing, a short time ago, some extract of lemon, I was surprised to find that a large percentage of the oil of lemon employed was insoluble in alcohol. The insoluble portion, evidently fixed oil, was not acted upon at all by new additions of strong alcohol, and amounted to over 33 per cent., a little over two pounds remaining from six pounds of oil of lemon. This residue was introduced into a still, with five gallons of water, and distilled until three gallons of distillate were obtained; the first gallon contained about ten ounces of oil of lemon; the remaining two gallons had but a slight odor of lemon, and remained perfectly clear after standing for more than a week.

The fixed oil remaining in the still, when separated from water, amounted to about 1½ pounds or 25 per cent. of the oil of lemon originally used. It was of a viscid consistence, (intermediate between olive and castor oil,) insoluble in absolute alcohol, but readily dissolved by ether or chloroform, of a yellow color and of a very rancid odor and taste. Its sp. gr. was 0·925 at 62° F.; its boiling point was not ascertained, as I was not in possession of a thermometer graduated sufficiently high, but it is above 500° F. It is acted upon violently by nitric acid, less so by sulphuric acid, and least by chlorhydric acid. The most

* The amount of phosphoric acid is insufficient to keep all the iron in solution after it becomes oxidized by contact with the air. Diffused daylight is without action on it. J. M. M.

remarkable fact in regard to it is that it is not saponifiable by alkalies, either at ordinary or boiling temperatures, all experiments to that effect having failed. As all fixed oils, whether of vegetable or animal origin, are saponifiable, it is not improbable that this oil is of mineral origin, perhaps approximating to the so-called lubricating oils obtained from lignite, which sometimes have a sp. gr. as high as 0·960 (*Oppler*). My knowledge of these oils is, however, but limited, and I can therefore merely state these facts, but shall, perhaps, find time shortly to give the subject more attention, when I will communicate the results.

The oil of lemon under consideration reached us through a Chicago firm, but has not been traced further. It was of tolerably good odor, but more viscid than the ordinary oil of lemon, and had a sp. gr. of 0·890 at 62° F., which is considerably higher than that of pure oil of lemon.

Louisville, Ky., July 11th, 1867.

ON A PERMANENT SOLUTION OF PYROPHOSPHATE OF SODA AND IRON.

By John M. Maisch.

A "subscriber" desires some light regarding a heavy white precipitate which appears, on standing, in a secret preparation styled Elixir of Pyrophosphate of Iron and Soda. Having never seen the preparation in question, and not being over anxious to analyze a medicine when the so-called proprietors withhold the formula and modus operandi, we will endeavor to throw some light on the other desire of our correspondent,—to obtain a working formula for such a preparation. In this connection it will not be amiss to give a short historical sketch of our knowledge of the pyrophosphates.

About forty years ago, S. Engelhart* observed that albumen is precipitated by phosphoric acid prepared by burning phosphorus, or by heating the ordinary acid to redness. Shortly afterwards, Stromeyer noticed that phosphate of soda, heated to redness, will precipitate silver salts white, and the same discovery was made about the same time by Clarke,† who applied to the

* Poggend. Ann. ix. 631.

† Edinb. Journ. of Science, vii. 298.

acid thus obtained the name of pyrophosphoric acid. Stromeyer* proved that the two phosphoric acids have the same composition, and that the precipitates by pyrophosphate of soda in solutions of the metallic oxides are redissolved by an excess of the precipitant; exceptions are mercuric and chromic oxides, baryta, strontia and lime, which are soluble only in small proportions. Stromeyer observed also that by heating with nitric acid, also with sulphuric, muriatic, acetic and ordinary phosphoric acids, the pyrophosphoric acid and pyrophosphate of soda are converted into the ordinary acid and phosphate.

Graham† published, in 1833, the results of his beautiful investigations on the constitution of phosphoric acid and the phosphates, and added a third one—metaphosphoric acid—to those previously known.

Boussingault‡ found that insoluble phosphates cannot be converted into pyrophosphates by heating to redness.

Peligot§ analyzed recently prepared glacial phosphoric acid, and found it to be the monohydrate; after it had partly liquefied by absorption of moisture and crystallized again, the lower layer of crystals consisted of the deutohydrate, and the upper layer of the terhydrate.

Persoz‖ observed that the solutions of several double salts of pyrophosphates possess a peculiar behaviour towards various reagents, which are useful for detecting metallic oxides, but do not disturb their solution in the form of a double pyrophosphate. It occurred to him that a soluble double pyrophosphate of iron might be a valuable curative agent, for obvious reasons; and he prepared a solution of the ferric soda salt by converting 32·5 grm. crystallized protosulphate of iron into the tersulphate, adding enough water to make one litre of solution, and mixing this with one litre of solution of crystallized pyrophosphate of soda prepared from 110 grammes with sufficient water. This solution contains in each litre 3·27 grammes of iron = 4·68 grm.

* Götting. gelehrte Anzeigen 1830, No. 12.
† Philosoph. Transact. 1833, ii. 253.
‡ Ann. de Chim. et de Ph. 1834, fevr. 185.
§ Ann. de Chim. et de Ph. lxxiii. 286.
‖ Ibid, lxviii. 163.

sesquioxide = 10·99 grm. $2Fe_2O_3,3bPO_5$ = 13·36 grm. $2\ Fe_2O_3$-$3bPO_5$, 9HO. This latter amount is equal to 206 troy grains, and each fluidrachm of the solution as used by Persoz contained therefore 1·45 troy grains of hydrated pyrophosphate of iron.

In 1849, Dr. Leras advocated the use of the same compound,* because he conceived that it was the only preparation not precipitated by the agency of the food or gastric juice,—a supposition which I shall prove to be incorrect.

A few years later, Professor L. A. Buchner† again called attention to Persoz' observations. Based upon the experience that the bitter saline taste of the sulphate of soda formed produces an aversion when used continually in the recommended strength, Buchner proposed to prepare it from perchloride of iron, to dilute it so that 16 ounces represent one grain of metallic iron, and to impregnate the solution with carbonic acid. For convenience he recommended a normal solution, containing in each ounce one grain of iron, so that the physician might obtain a solution of any desired strength. This preparation, we are informed, is still used by many physicians of Munich.

Robiquet‡ proposed to combine ferric pyrophosphate with citrate of ammonia (or of soda), to render it permanently soluble in water. Many formulas for liquid and solid preparations of this compound were subsequently published in the pharmaceutical journals of all countries, and the dry salt was admitted into our pharmacopœia.

In 1859, A. F. Haselden§ and myself‖ noticed the solubility of the *ordinary* ferric phosphate in citrate of ammonia, and Prof. Procter published some formulas¶ for prescribing extemporaneously the phosphate of iron in solution. I am not aware that the therapeutic value of ferric *pyrophosphate* was ever claimed to be superior to the *ordinary phosphate*, except for its solubility, and this at a time when the solubility of the latter was un-

* See U. S. Dispensatory, 1866, 1144.
† Repert. f. d. Pharm. 3 Ser. vii. 38, 1851.
‡ Gaz. Méd. de Paris, 1857, No. 7. See Am. Journ. Ph. 1857, 401.
§ Pharmaceut. Jour. August, 1859.
‖ Amer. Jour. Pharm. 1859, Sept., 410.
¶ Ibid, 413.

known, except in acids. It seems that in England this solution of the phosphate in citrate of ammonia is, or rather was used under the name of pyrophosphate,* with which it closely agrees in color, solubility, stability and taste; and it is remarkable, therefore, that our pharmacopœia adopted this last preparation, which possesses probably no advantage except that of a higher price.

Heydenreich† examined more closely the behaviour of phosphate of iron in contact with its various solvents, and again recommended it for medicinal use.

The latest investigation is by J. H. Gladstone,‡ who confirms the analysis of the hydrated pyrophosphate of iron ($2Fe_2O_3$, $3bPO_5$, 9HO), and observed the existence of an allotropic ferric pyrophosphate, which is insoluble in alkaline pyrophosphates, and which is obtained by heating a solution of the pyrophosphate with a large excess of sulphuric acid.

Before I had seen Dr. Gladstone's paper, and while experimenting with the view of obtaining a permanent solution of pyrophosphate of iron and soda ("Subscriber's" note was received in the beginning of June), I had noticed that the precipitate from a mildly acid solution of the double pyrophosphate, which had formed in the course of a few weeks, was so different in its behaviour to the usual solvents of ferric pyrophosphate, that I inferred a change to ferric *phosphate* had taken place under the influence of the acid. Since meeting with the above paper, however, I have convinced myself that it consists still of pyrophosphate, though Stromeyer may be correct in regard to the conversion of pyrophosphates into phosphates by continued boiling with acids.

I have endeavored to prevent this change, and from a large number of experiments which have been made I select the following, as capable of throwing some light on the subject. To avoid frequent oxidation of the protosulphate of iron, I made use of the carefully prepared officinal solutions of persulphate of iron, —namely, of the liquor ferri subsulphatis and liquor ferri ter-

* Amer. Jour. Pharm. Sept. 1859, 412.

† Chem. News, iv. 158.

‡ Chem. News, xv. 327.

sulphatis, the former of which represents 480 grains crystallized protosulphate of iron in each fluidounce, consequently 1 gramme in each cubic centimeter, while the latter contains only half that quantity in the same measure,—namely, 240 grains in the fluidounce, or ·5 grm. in each cubic centimeter. Instead of the protosulphate of iron ordered by Persoz, corresponding quantities of these solutions were used.

1. The pyrophosphate of iron was made from tersulphate of iron at the boiling point of water; the precipitate was insoluble in the soda salt; the liquid reacted acid.

2. Made at 125° F. solution was effected, but precipitation commenced before the whole of the liquid could be filtered.

3. Temperature 100° F. Solution complete; the filtrate remained clear for several days. At the end of ten or twelve days a bulky precipitate had appeared; the clear supernatant liquid was separated, but continued to precipitate. Exclusion of light did not prevent precipitation.

4. Ordinary temperature (between 70 and 80° F.) Solution took place slowly, the liquid retained a slight opacity; precipitation commenced in a few days.

5. The ferric pyrophosphate was made from subsulphate of iron at the boiling point; solution took place rapidly; color brown-yellow. Precipitation takes place slowly.

6. Operated at ordinary temperature. Solution takes place without difficulty; liquid colorless, perfectly transparent; becoming brownish-yellow on boiling; slight precipitation as under No. 5.

7. Ammonia added to Nos. 4 and 6 produced a reddish-brown color; liquid clear and transparent after seven weeks.

8. Sulphuric, muriatic, nitric or phosphoric acid added to No. 6 until the reaction was acid, instantly caused a turbidity and induced precipitation, which gradually increased.

9. Syrup added to No. 7 remained transparent in thin layers after seven weeks, but the color was darkened, so as to appear brown-black in reflected light.

10. Little alcohol added to No. 9 remained transparent for several days, then it became darker in color and gradually pro-

duced a whitish precipitate, the supernatant liquid retaining a yellowish brown color.

11. Before precipitation commenced, No. 6 was mixed with solution of citric acid, a slight turbidity appeared without producing a precipitate; in the course of a week syrup and little alcohol was added; the liquid remained unchanged in appearance for six weeks.

12. No. 11 was boiled, when the cloudiness increased; the alcohol which had evaporated was added, when the liquid at once became turbid and precipitated.

13. Before precipitation commenced, No. 6 was mixed with acetate of ammonia, which did not react upon the iron, and the solution remained transparent for seven weeks.

14. Alcohol, added to No. 13, produced turbidity and gradually a white precipitate.

15. On boiling, No. 13 assumed a slight yellowish color, then became milky and gradually produced a white precipitate.

16. No. 8, which had been rendered turbid by the addition of sulphuric acid, became clear and almost colorless again on the addition of carbonate of ammonia, and remained in this condition for seven weeks.

17. Little alcohol added to No. 16 gradually produced a white precipitate.

18. Boiling scarcely affects No. 16, except in the presence or subsequent addition of alcohol.

19. 1 part *pure* pyrophosphate of iron with 5 parts pyrophosphate of soda, dissolved in 120 parts distilled water, yielded a colorless solution, remaining clear for seven weeks, with the exception of the production of a little mould; boiling did not sensibly affect it, but disposed it to the slow separation of a white precipitate.

20. No. 19 gradually yielded a white precipitate with little alcohol.

21. Little phosphoric acid added to No. 19 did not cause any change except, on heating, a white precipitate.

22. No. 19 gradually became yellowish on standing, with little citric acid; boiling rendered it turbid.

23. No. 19 yielded a clear brown solution, with an excess of ammonia; nearly the whole of the iron was deposited in the course of a few weeks as brown floccules.

24. Pure pyrophosphate of iron, apparently dissolves in ammonia to a transparent brown liquid, which separates gradually the iron in the form of bulky brown flocks, readily suspended, by agitation with syrup, to a nearly transparent liquid.

25. Tartaric or citric acid added to No. 24 yields a permanent solution.

26. Acetate of ammonia added to No. 24 does not prevent the separation of the ferric oxide.

27. 1 part *officinal* pyroposphate of iron with 5 pyrophosphate of soda, dissolved in 120 parts distilled water, yielded a faint green yellowish solution, in which, on standing, a slight precipitate occurred.

28. Little alcohol added to No. 27 favors the separation of the deposit and increases it.

29. Citric acid added to No. 27 appears to merely increase its tendency to mould.

30. Phosphoric acid has little action on No. 27 in the cold, but when heated will render it turbid.

31. An excess of ammonia added to No. 27 yields a clear liquid which slowly deposits the iron, and this may be readily suspended again to an almost transparent brown liquid by agitation.

Summing up the results of the foregoing experiments we find:

I. Pure pyrophosphate of iron, dissolved in pyrophosphate of soda, will be retained in permanent solution only in case the liquid is kept slightly alkaline or strictly neutral.

II. This solution will be disposed to precipitate gradually the iron salt if alcohol is present or the liquid becomes acid from any cause whatever.

III. A boiling temperature promotes the change of the iron salt, either to the insoluble modification of pyrophosphate or to the ordinary phosphate; the presence of acids and certain salts hasten this change.

The difficulty of obtaining a permanent liquid pharmaceutical

preparation explains itself from the above, particularly if a so-called "elixir" is desired, which term now-a-days applies to pleasant forms of alcoholic beverages. The necessity of such a preparation is moreover very questionable, since the ordinary perphosphate of iron is readily kept in solution by citrate of ammonia, since we have an officinal soluble pyrophosphate of iron containing about half its weight of the pure ferric salt, and since solution of pyrophosphate of iron in pyrophosphate of soda may be made extemporaneously without difficulty. We append the following two formulas, as indicating the mode in which it may be prescribed:

℞.	Liquor. ferri tersulph.,	♏ lx.
	Sodæ pyrophosphatis,	gr. C.
	Ammoniæ carbonatis,	gr. xxx.
	Aquæ destillatæ,	f℥ vij.
	Syrupi simplicis,	f℥ vi.
	M.	

In this formula the addition of some carbonate of ammonia is necessary to at least neutralize the acid liberated. The next one does not require this addition, unless kept on hand for a long time:

℞.	Liquor. ferri subsulphat.,	♏ lx.
	Sodæ pyrophosphatis,	gr. CC.
	Aquæ destillatæ,	f℥ xiv.
	Syrupi simplicis,	f℥ iss.
	M.	

The mode of manipulation is to dissolve the pyrophosphate of soda in about one-half of the water, add the syrup, then the iron solution and, without the application of heat, agitate for a few minutes until the precipitate is redissolved; finally add the remainder of the water, holding, in the former case, the carbonate of ammonia in solution. Acids and tinctures must be avoided; if some flavor is desired, a *distilled* medicated water may be substituted for the whole or a portion of the water.

If the iron solutions had been properly prepared, these preparations will be permanent, and each fluidrachm will contain $1\frac{1}{5}$ grains of dry pyrophosphate of iron, equivalent to about $2\frac{1}{2}$ grains of the officinal salt of that name.

NOTES ON POWDERED CASTILE SOAP.

By Joseph P. Remington, Brooklyn, N. Y.

The following notes are contributed to the present fund of knowledge on the subject of drug powdering:

Exp. 1. 986 avoirdupois ounces of white Castile soap (Conti) were shaved into thin slices, by means of a common cabbage cutter, then spread on shallow trays, and exposed to the air in a drying room, temp. 84° F., for one week, transferred then to a drying room, temp. 125°, and left there three weeks, at the end of which time it weighed 724 ounces avoir., thus losing 26·57 per cent. of water; it was then powdered in the ordinary chaser or Chilian mill, and lost 7 ounces more in the process of pulverizing, making the total loss 27·28 per cent.

Exp. 2. 960 ounces avoirdupois of the floating variety of white Castile soap, after standing in a moderately dry room for fifteen months, (losing 224 ounces, or 23·3 per cent.) on being further dried and powdered, in a similar manner, lost 56 ounces more, making a total loss of 280 ounces, or 29·16 per cent.

Exp. 3. 1112 ounces avoirdupois of mottled Castile soap (commercial) treated precisely in the same way, lost 320 ounces, or 28·8 per cent. The average loss on five previous lots was 21 per cent., the amount of water present varying in each case, losing respectively 20, 11½, 18, 27 and 29 per cent. The lots which lost 11½ and 18 per cent. had undoubtedly been kept some time, and in the case of the lot losing 11½ per cent., half of the water which would help to form the ordinary loss was lost before it was sent to powder. The first and last experiments were made with soap recently imported. It will be noticed that in these experiments (which I may state were carefully conducted) that the mottled Castile soap does not support its reputation for strength, (its only credited merit over the white.) According to the U. S. Dispensatory, good mottled Castile soap should not contain more than 14 per cent. of water; this contained, then, double the proper amount. The same authority states that white Castile soap should not have more than 21 per cent. in both experiments with the white, it was found to contain an excess of at least 6 per cent. of water.

There is an important reason for not putting the soap in the room of higher temperature at first, for it would then melt, instead of drying properly, and become unmanageable. The powder from the first experiment was fine, light, and very white; that from the second was not so white, owing, probably, to the fact of its being kept a greater length of time and the presence of a little sesquioxide of iron, the color of the iron being masked when the soap was fresh, as in the first experiment, the iron being then in the state of protoxide; 21 cents per lb. was paid for the white soap (in Exp. 1) which was a low figure, (Feb., 1867), and as the loss was 27·28 per cent., allowing 12 cents per lb. for powdering, the lowest cost of the powder would be 38 cents, and yet a powdered white Castile can be *bought* for that price; the inference regarding the character of such a powder is of course unmistakable. It would be an easy task for the Pharmacist to prepare his own powdered soap, the only necessary outlay would be for that unscientific instrument, the cabbage cutter, which, however, could be used with advantage in making tinct. sapon. camph., opodeldoc, soap plaster, &c., not to speak of its legitimate use; for small operations the soap could be shaved with a spatula. If a drying room is not at command, the difficulty of drying it thoroughly may be overcome by shaving the soap very thin, then spreading on paper and setting in a warm place; the drying of course is hastened by a current of air. After it becomes dry and friable, it can be easily powdered in a mortar and sifted through a fine sieve, and the Pharmacist has then the satisfaction of saving the difference in the cost of powdering and of furthering the cause of "Medicinæ Puritas."

ON EPSOM SALT IN CITRATE OF MAGNESIA SOLUTION.

By William R. Warner, of Philadelphia.

Much of late has been written on Citrate of Magnesia, but no very definite or satisfactory data have been arrived at, whereby the difficulty of obtaining an uniformly permanent solution has been overcome and a desirable result attained. Much improvement, however, in the construction of the formula has been made; the same being made easy of manipulation over the old receipt of

the former edition of the Pharmacopœia. It is not my intention here to try to solve the problem.

My attention has been directed to an article labelled "Effervescent Solution of Cit. Magnesia," extensively manufactured and sold by a firm in this city. An analysis of this preparation shows Epsom salt amongst its constituents, and upon which its efficacy mainly depends.

Resulting from this investigation, I have constructed a formula with such additions and alterations as might seem to make it complete, when it may be desirable and necessary for the physician to prescribe such an article.

It is as follows:—

℞. Acid. Citric,	℔j	(Av.)
Magnesiæ Calcin.,	3½	oz. "
" Sulph.,	6	" "
Aquæ Puræ,	Cong. j.	

The above ingredients may be thrown together in a bottle, and occasionally shaken until dissolved; then filter.

As it affords a permanent solution, any quantity desirable may be prepared at a time, or as called for, if preferred, by taking of the above solution, to each bottle, four fluidounces; lemon syrup, ten drachms; bicarbonate of potash, one-half drachm; fill conveniently full with water, and securely cork.

The syrup and flavor, with the excess of acid, serves to cover very effectually the disagreeable taste of the sulphate of magnesia. This solution, which contains about half the quantity of citrate of magnesia intended by the officinal formula, affords an active purgative in full doses, without the embarrassment occasionally produced upon the stomach by the officinal preparation, and to this may be added the advantages of permanence and economy afforded by this formula.

PHARMACY OF THE CINCHONAS.

By Edward R. Squibb, M. D., of Brooklyn, N. Y.

(Continued from page 303.)

The experiments undertaken to elucidate this subject have occupied more than six weeks of time, and involved over forty percolations on the scale of the Pharmacopœia, and some fifty

or sixty assays, and yet it is hoped that all the most useful results and deductions may be presented by a few examples in a small space.

The Cinchona adopted for the experiments was the Red variety, because this involves the greatest difficulties in management, and any formula based upon it would be more easily applicable to the other varieties. A well-known lot of Red Cinchona, in the condition of a very fine commercial powder, was taken, and its proportion of impure alkaloids was reconfirmed by the critical application of Winckler's full process of assay, and also by the modification of his process above given with the apparatus, materials and other adjustments, which were prepared in quantity to be used throughout the course of research. The proportion of impure alkaloids was determined to be 34 grains to the 1000 grains of the powder, or 3·4 per cent., and it was thus proved to be a high grade of Cinchona, and well adapted to yield safe typical results for use as a model. It was of a rich full red color, compact and dense in structure before powdering, was very dry, and yielded a very fine, light, bulky, mobile powder, of a thoroughly uniform character and quality. The percolations were made without excessive care, or more skill than would be ordinarily applied to the process, but the separation of the different measures of the different parts of the percolate as it came through were made with care and accuracy by means of standard measuring flasks marked in the neck, and by the use of graduated pipettes.* Parallel experiments were always carried along together, and when unexplained variations occurred, the experiments were repeated for confirmation, so that neither care nor ordinary judgment were wanting to secure accuracy in the results.

* It may be usefully remembered that about 29·52 cubic centimeters is a fluidounce, and that in practice this becomes pretty accurately 30 c. c. Thus, a graduated French pipette of say 50 c. c. capacity becomes a most useful instrument in the management of our fluidounce measure. Recently some of the importers of French and German graduated pipettes have imported some of just 30 c. c. capacity, and divided into 0·2 c. c., which are still more convenient. By means of these the common "graduate measures" can be easily tested in all their sub-divisions.

The first experiments were made with mixtures in various proportions, of alcohol and glycerin as a menstruum, but it was found that where less than the present officinal measure was to be the result these mixtures were not easily practicable, and that even with the present measure for the fluid extract the management was difficult and tedious. A percolator with but twice the officinal quantity, and not tightly packed, and managed by Mr. Taylor's formula, with a menstruum of equal measures of alcohol and glycerin, has now stood upon the writer's table since near the commencement of these experiments. From April 15th to May 23d was required for liquid to reach the lower end of the percolator, and now, June 11th, the amount of percolate accumulated in the flask does not amount to more than four fluidounces. As the weather grows warmer the rate increases a little, but the prescribed measure will hardly be received before the autumn. The percolate is very peculiar, and the exhaustion will be sudden and perfect with the very smallest possible quantity of menstruum, for it is an axiom in percolation that the slower it is performed the more perfect and sudden is the exhaustion, and with the smallest quantity of menstruum. With a conical percolator, however, without packing, but with only a gentle compression of the moistened powder after it is all in the funnel, and in warm weather, a very nice preparation of the officinal measure may be obtained by Mr. Taylor's process, if the one to be offered further on be not admitted as preferable. In this the use of glycerin in the menstruum is given up, as being difficult and without any compensating advantage, since both alcohol and diluted alcohol were proved to exhaust the bark as perfectly when used alone as when mixed with the glycerin. That is, the proper function and uses of the glycerin being to preserve the preparation rather than to extract the Cinchona, it is added where its usefulness begins,—namely, after the extraction of the bark. This point established, it next became necessary to decide between alcohol (officinal s. g. ·835, or 85 p. c.) and diluted alcohol (officinal s. g. ·941, or 39 p. c.), as the best menstruum by which to extract the medicinal properties of the Cinchonas; and in the investigation of this question it must be borne in mind that the best menstruum not only involves the

cheap, easy, perfect and speedy exhaustion of its medicinal properties, but also involves the leaving behind it all that is not medicinal, because such matters are objectionable not only as being useless, but as overloading the preparation. The question also involves the extraction of the medicinal properties in their natural condition and combinations in the case of the Cinchonas. In assisting to decide between these two menstrua, the following results of a carefully conducted experiment may be given. Two portions of 16 troyounces each were moistened with 10 fluidounces of menstruum, packed as nearly alike as practicable, in cylindrical glass percolators of the same size and form, and then managed throughout as nearly the same as was easily practicable, the only intentional difference being that Alcohol was used with one and Diluted Alcohol with the other. The percolates were received in separate portions, the first portion of 16 f℥., aud then six other portions of 8 f℥. each, making in all four pints of percolatê in seven portions. From each portion, as received, 30 c. c. or 1 f℥. was taken, to determine the proportion of extract, and exactly the same quantity to determine the impure alkaloids by the process of assay previously described. The portions for extract were dried at a temperature of 220° F., or 105° C., for five hours, and thus gave a uniform resinous extract that was quite dry. The portions for assay were managed in a uniform way, so that their relations as series might be tolerably accurate, though their relations to the Cinchona might be less so. This trial was repeated three times without obtaining the uniformity of result that was desired and expected, though two of the pairs agreed within useful practical limits, and all agreed in their general indications. The general result is that the alcoholic menstruum yields the most extract and the most alkaloids, though even as a general result, this must be received subject to farther confirmation, because slight differences in managing the percolations materially modify the results. For example, the alcoholic menstruum, everything else being equal, passes most rapidly; and this circumstance is not favorable to rapid or perfect exhaustion with a given amount of menstruum. Then if the packing for alcohol be harder, so as to bring the rate of percola-

tion nearer to uniformity, the exhaustion by the thinner, more mobile menstruum must from these physical properties be better. And when it is borne in mind that the exhaustion of Cinchona, even when in very fine powder, is not complete either in regard to extract or alkaloids, by four or even by five pints of percolate from 16℥, the difficulties in arriving at accuracy will be easily understood. The results are therefore given as being useful, though not fully established, but as quite safe in their relations to pharmacy, supported as they are upon other good grounds, hereafter to be alluded to. The results of one good pair of the percolations is as follows:

TOTAL PERCOLATE 4 PINTS.	PERCOLATED WITH OFFICINAL ALCOHOL, 85 P. C.				PERCOLATED WITH OFFICINAL DILUTED ALCOHOL, 39 P. C.			
Divided into 7 successive portions, the first 16 f℥., the others 8 f℥. each.	Yield of Extract dried at 105° C.		Yield of impure alkaloids.		Yield of Extract dried at 105° C.		Yield of impure alkaloids.	
From each portion 30 cc. = 1 f℥. taken for drying, and for assay.	From the 30 c.c., or 1 f℥.	From the whole portion of percolate.	From the 30 c.c., or 1 f℥.	From the whole portion of percolate.	From the 30 c.c., or 1 f℥.	From the whole portion of percolate.	From the 30 c.c., or 1 f℥.	From the whole portion of percolate.
	grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs.
1st portion 16 f℥.	61·5	984·0	7·15	114·4	57·2	915·2	7·30	116·80
2d " 8 f℥.	27·6	220·8	4·80	38·4	28·3	226·4	4·60	36·80
3d " "	18·2	145·6	3·30	26·4	13·0	104·0	2·08	16·64
4th " "	13·4	107·2	3·00	24·0	7·8	62·4	1·10	8·80
5th " "	9·7	77·6	1·50	12·0	6·0	48·0	·55	4·40
6th " "	7·2	57·6	1·30	10·4	5·0	40·0	·50	4·00
7th " "	5·9	47·2	0·90	7·2	4·5	36·0	·43	3·42
Total,	143·5	1640·0	21·95	232·8	121·8	1432·0	16·56	190.86

This Cinchona had been previously found to contain 3·4 p. c. of impure alkaloids, which would give 261 grs. as the proportion in 16℥, or 7680 grs. of the powder. These percolations give with alcohol 232 grs., with diluted alcohol 191 grs. The loss of 29 grs. in the first may be due chiefly to the seven processes of assay instead of one, and to a very small extent to the more perfect exhaustion in the case of the one critical assay. If this 29 grs. be adopted as the error for loss by these causes, and be applied to the results from diluted alcohol, the difference in the yield of impure alkaloids by the two menstrua would be 41 grs., or 15·7 per cent. of the whole, in favor of alcohol as a menstruum.

The indications which may be drawn from a comparison of

the dried extract are in the same direction, and here the chances of error and inaccuracy are somewhat diminished, whilst the experiments for extract were more numerous, though the difference in the proportion was often smaller than in these two percolations. Here the difference is 208 grs., or nearly 12·7 per cent. of the whole extract in favor of alcohol as a menstruum. The dry extract by alcohol is of a richer darker color, and makes a heavier denser powder. The powdered extracts, when subjected to the solvent action of Alcohol, Diluted Alcohol, and Acidulated Water, in the cold, dissolve in the following proportion:

Of the Alcoholic extract, 85·8 p. c. is soluble in Cold Alcohol.
78·8 " " Diluted Alcohol.
49·7 " " Acidulat. Water.
Of the extract by Dil. Alcohol, 85·4 " " Cold Alcohol.
87·8 " " Diluted Alcohol.
51·7 " " Acidulat. Water.

But the amount of extract yielded to Alcohol being 12·7 per cent. greater—or, by concession to the diluted menstruum, in order to avoid all probable sources of error, say only 5 per cent. greater,—then the proportion of total extract soluble again would stand as follows:

	Alcoholic Extract.	Extract from Dil. Alcohol.
By Alcohol,	90·09 p. c.	85·40
Dil. Alcohol,	82·74 "	87·80
Acid. Water,	52·18 "	51·70
Total redissolved,	225·01	224·9

Or, would be practically the same in weight. The residue left undissolved by these menstrua is, however, very different in appearance from the two extracts. The portion of the alcoholic extract insoluble in alcohol is pulverulent, tasteless, and insoluble in water. The corresponding portion from the extract by Diluted Alcohol is compact, of a gummy fracture, slightly bitter and saline in taste, waxy between the teeth, and soluble in water to a considerable extent. The insoluble residues left by Diluted Alcohol were similar in appearance and taste, and in solubility, though very unlike in quantity. That of the extract from Diluted Alcohol is much smaller in quantity, and more waxy between

the teeth. The residues insoluble in acidulated water differ slightly in color and density, and are both more bitter than the other residues. All the residues are freely soluble in weak alkaline solutions, but those from acidulated water only are bitter.

The percolate from a pair of these percolations, after standing about four weeks in the flasks, only loosely covered from dust, showed a bulky looking deposite in the first five flasks of each percolate, but no deposite in the last three flasks. This deposite was carefully filtered out on weighed filters, dried and weighed. That from the alcoholic percolate weighed 23·3 grains; and that from the Diluted Alcohol percolate 22·2 grains, or practically the same, and very small in proportion to the appearance of the deposite when in the liquid. This deposite commences to form in the percolate within twenty-four hours after the percolate is received, and as soon in the one case as the other. That from the Alcoholic percolate, when dry, separates from the filter easily and completely, and is lighter colored, less dense, and is bitter. That from the Diluted Alcohol percolate adheres to the filter, and is only partially separated by scraping, is darker colored, more dense, and is tasteless, or very nearly so. Both are nearly all soluble in boiling alcohol, and in great measure deposited again on cooling. Both are nearly all soluble in a cold mixture of one-fourth glycerin and three-fourths alcohol, and the solubility is not perceptibly increased by heating; nor is there a perceptible deposite on cooling. These solutions are deep blood-red, and pleasantly bitter. They contain alkaloids, but in too small a proportion to be estimated without more time and skill than the writer has at command. It may be stated here as a matter of judgment,—and not at all of research,—that the proportion of alkaloids in the deposite from well-made preparations of Cinchona has been commonly over-estimated, and may be safely disregarded in practice with Cinchonas, the best qualities of which often vary to the extent of a half to one per cent. in the alkaloids they contain. For example, if this whole deposite was alkaloids, instead of containing only a small proportion, and should be added to the previously ascertained alkaloid value of this bark, it would only raise it from 3·4 per cent. to 3·7 per cent., while the differ-

ent lots of all the higher grades of Cinchona vary among themselves far more than 0·3 per cent. Therefore, until we become more critical and expert in the selection of Cinchonas in the markets, such refinements seem superfluous, and may be safely postponed to a more advanced stage in the progress of pharmacy.

While the general tendency of all the experiments and deductions is toward Alcohol as the best menstruum for exhausting Cinchonas, it may yet be safest, in view of the previous universal usage, to leave the question still open for farther research and confirmation, accepting the results here given only so far as to admit that Alcohol is a good menstruum, and capable of accomplishing the object without difficulty or disadvantage, except from its greater cost. This much being taken as established, other results come up for consideration.

All the experiments show conclusively that Cinchona is much more difficult to exhaust than was heretofore commonly supposed; and that the quantity of percolate prescribed by the Pharmacopœia for the fluid extract, instead of being excessive, as was believed by the writer, must, under any ordinary management, with good Cinchona, come far short of practical exhaustion, by either menstruum, even when fine powder is taken instead of the "moderately fine," (50 meshes to the inch,) as directed. Repeated experiments with powder that passed easily through bolting cloth of 110 meshes to the inch, and with both menstrua, showed that the fifth pint of percolate contained by assay from a half to two per cent. of the total impure alkaloids in the Cinchona. The officinal quantity of percolate cannot therefore be accepted as practically sufficient with either menstruum. Nor is the prescribed fineness of powder well adapted to economical exhaustion. The apparent exhaustion of the coarser powder by Diluted Alcohol must have been judged of by the color and taste of the percolate, and is apparent only, the outside of the particles being only imperfectly washed or exhausted by the passing menstruum. With fine powder and the same menstruum the color and taste are very different.

The percolate instead of being "evaporated by means of a water bath" should with either menstruum be distilled, and the

Alcohol saved. By the officinal process with Diluted Alcohol, when either evaporated as directed, or distilled as proposed, until the residue measures the prescribed two pints, all the Alcohol, practically speaking, will have passed off, leaving a yellow muddy looking liquid, which, with the sugar added, measures over $2\frac{1}{2}$ pints, and requires prolonged heating and stirring to get it down to the prescribed two pints of finished product. This fluid extract, often while hot, and always when cool, is a muddy looking inelegant preparation too thick for convenient use, and yet representing the Cinchona in double its weight. The Alcohol, however, lost by the officinal evaporation, is almost entirely saved if distilled in a water bath, and when diluted to the prescribed strength, is ready for use again, whilst the additional heat required for distillation is more than counterbalanced by the long exposure and oxidation incident to evaporation.

On the other hand, if Alcohol be used as the menstruum, and in sufficient quantity for a thorough practical exhaustion of the Cinchona, the percolate, no matter how large in quantity, may be distilled in a water bath with ease, with much less heating, in a much shorter time, and the Alcohol may be saved with the exception of 12 to 20 per cent. loss, incident to percolation and distillation. This loss is about the same upon four pints as upon six, and varies with the amount of knowledge and skill applied to the process. The residue in the still after distillation consists of 5 or 6 f℥ of dense liquid extract, transparent, of a fine rich red color, nearly free from Alcohol, and containing the whole of the medicinal properties of the percolate, unimpaired by prolonged heating or oxidation. This, by ten minutes active stirring on the water bath, may be reduced without change, except in consistence, to a tenacious extract, weighing less than 4℥, which becomes brittle when cold, and is almost entirely soluble in Alcohol. This extract is entirely soluble in Glycerin in all possible proportions, and the solutions appear to be permanent. It is also soluble in all mixtures of Glycerin and Alcohol; and in all mixtures of Glycerin and water which do not contain more than one-fourth of their volume of water. It is soluble in a mixture of equal measures of Glycerin and water while hot,

but a large proportion is deposited on cooling. When dissolved in an equal weight of Glycerin this dense solution is soluble in all proportions in Alcohol, Diluted Alcohol, Brandy and Whiskey, but makes a turbid solution with wines. The permanence of these solutions cannot of course be determined within the few weeks embraced in these experiments.

From these results, affecting the pharmaceutical management alone, (having established the chemical and physical equality of the two menstrua,) it will probably be admitted by all, that Alcohol is the best menstruum for pharmaceutical use with the Cinchonas, and this point is considered by the writer as established.

The advantages of Glycerin over Sugar are too apparent and too decided to admit of doubt, or to warrant any farther detail, and it is considered that nothing short of some unexpected development of time in the keeping of the preparations can overturn the conclusions of Mr. A. B. Taylor on this point, and these may therefore be accepted as also established.

Then the only notable objection to reducing the volume of the fluid extract to an accordance with the fluid extracts in general, is that it doubles the strength of a preparation now pretty well known and in established use, a change always very objectionable, though in this instance not dangerous, whilst it is supported by considerations of convenience, economy, and uniformity, and by the increased probability of being beyond future change or discredit. Taking all the circumstances into consideration, the writer recommends the next Committee of Final Revision of the Pharmacopœia to adopt these changes, provided the preparations keep well; and to test this last point, a set of specimens are preserved by the writer, duly labeled with references to this paper, and these specimens are now placed at the service of the future Committee of 1870, in case of casualty to the writer. Portions of the preparations have also been placed in the hands of judicious physicians for critical trial in practice.

It now remains only to give the detailed formulas which are based upon the foregoing observations and deductions, with the necessary comments upon their practical application. These are given in the order in which they are found in the Pharmacopœia.

Little can be usefully said in regard to the officinal Decoctions and Infusions of the Cinchonas. In the writer's judgment the barks should be directed in fine powder—the finer the better. The use of an acid in the infusions, but not in the decoctions, affords the necessary variety to those who prefer either the undisturbed combinations of the Cinchonas, or to have these broken up and new combinations artificially produced by the superadded acid. In all these preparations, however, the bark is imperfectly exhausted at best, and good quality of Cinchona is indispensable to any very useful effect. The use of these preparations has very much diminished within the past few years, the result probably of damage to a deserved and well earned reputation, through the use of inferior barks.

Extractum Cinchonæ.

The officinal process yields a very good extract, and is simple and easy under proper management, but is still believed to be susceptible of improvement. In a critical trial with it, using a Yellow Cinchona which yielded over four per cent. of impure alkaloids and was therefore of very fine quality, it was found, first, that 3 f℥. of Alcohol is not sufficient to moisten the Cinchona for packing; that with four pints of Alcohol poured on top and followed by water, only about 3½ pints of "tincture," or alcoholic percolate free from water could be obtained; that then about 13 f℥. of percolate passed which was a muddy looking mixture of the Alcohol and water, when the percolate became transparent and watery, of a light wine color, but slightly bitter at first and very slightly bitter at last. The 3½ pints of alcoholic percolate yielded 3 pints of recovered Alcohol fit for use again, and within 3 grains of 3℥ of fine transparent extract. The 13 f℥. of percolate next following, yielded 3 f℥. more of weak Alcohol, and 116 grains of brown extract, mucilaginous but not very bitter. The 6 pints of watery percolate yielded 45 grains of black, tar like extract, mucilaginous and but slightly bitter. This latter extract appeared to contain but a mere trace of alkaloids, and these much changed by the long evaporation. The extract from the second portion of percolate appeared to be largely mucilaginous. From these results it is concluded that the alcoholic percolation of the officinal formula is not carried far

enough to practically exhaust the Cinchona, and that the watery percolation is entirely useless. The total extract of 3ʒ, 158 grs. is very nice and doubtless efficient, but in keeping becomes hard, resinous and soluble with difficulty. The defects of this process may be remedied and a better result obtained by the following formula:

Take of Cinchona, either Red or Yellow, in fine powder,
sixteen troyounces,
Glycerin, one troyounce,
Alcohol, six pints and ten fluidounces,
Water, a sufficient quantity.

Mix the Cinchona with thirty fluidounces of the Alcohol by thoroughly stirring them together in a proper vessel; cover the vessel and, having allowed the mixture to stand half an hour, pour it into a glass funnel prepared for percolation. Then pour the remainder of the Alcohol on top as required, and follow this with water until the percolate becomes cloudy and makes a precipitate in the receiving vessel. Then distil off the Alcohol from the percolate by means of a water bath, and stir the residue on the water bath until it becomes a thick extract weighing four troyounces. To this add the Glycerin and heat the mixture with stirring until a perfectly uniform mixture is obtained weighing not more than five troyounces. Each grain of this extract represents a little more than three grains of the Cinchona.

The Red Cinchona may be substituted for the Yellow in this formula when desired, the management required being the same for both.

The extract of Yellow Cinchona is more antiperiodic and less astringent. That from Red Cinchona perhaps more purely tonic and more astringent.

In working the above formula successfully, the powder should be very fine—the finer the better—and the Alcohol of full officinal strength (s. g. ·835.) After many trials with various proportions of Alcohol to moisten the powder, it was found that almost equally good results were obtained with all reasonable proportions after a moderate experience and skill were acquired in arranging and packing the percolator, but that the results were so much improved by education and skill that it was de-

sirable to adopt a plan which required the least skill, and would give uniform results without so much education and practice. The plan of wetting the powder into a uniform fluid magma was found, in the process for assay, to facilitate the perfect exhaustion of the powder, while it at once did away with all possible irregularity in rubbing up the moist powder and in packing it—the two points so essential to success—and those which require most education and skill in their proper performance. Beside this, when the powder is wetted into a uniform liquid magma the air in great measure escapes to the surface, thus diminishing a troublesome interference with uniformity in percolation, and, as the writer believes, diminishing the oxidizing effect by which this interstitial air changes a part of the alkaloids. To say the least, and without theorizing upon oxidation, the largest proportion of alkaloids were *almost* invariably obtained, both in the assaying and in the practical percolations, when the powder had been wetted to a uniform magma which could be poured into the funnel, or on the small scale, could be slowly transferred on the end of a spatula, to avoid smearing and loss. By allowing the wetted powder to stand for half an hour, covered to prevent unnecessary loss of Alcohol, before being transferred to the funnel, it swells and absorbs much of the menstruum, becoming much less fluid than when first mixed. This somewhat facilitates the exhaustion. The preparation or mounting of a funnel for percolation requires much care and some skill, and is so important that it will, even at this late day in the career of percolation, warrant a detailed description. The funnel should be of glass where any form of tannin is present as in the Cinchonas, and of a size not less than $8\frac{1}{2}$ to 9 inches across—the larger the better, within reasonable limits, since it holds more menstruum on top, and thus requires less attention and diminishes loss by evaporation. This should have as close a cover as practicable, and an ordinary breakfast or dinner plate—not turned upside down, but set into the funnel with the rim of the plate on the edge of the funnel, and with a piece of oiled muslin or oiled silk under it—serves an excellent purpose. The funnel should be supported in a funnel board, the hole being of such a size as to allow the funnel to pass more than half way through, and the

board should be mounted high enough to admit of the use of two pint flasks under the outlet. The percolate should always be received in flasks or bottles for the same reason that the funnel is kept closely covered, namely, to diminish the loss by evaporation in a slow process of dropping. Beside this, the flask may be converted into a sufficient still by means of a perforated cork, india rubber tube, condenser and an extemporized water bath. A piece of bung cork about 2 or 2¼ inches in diameter and an inch thick is filed to the shape of a truncated cone so as to fit the inside of the funnel over the outlet and lie firmly in its place, and a round piece of flannel or blanket is cut a little larger than the upper surface of the cork. A round filter 4 inches in diameter is cut in nearly to the centre all round by converging cuts with a scissors, and this placed under the cork applies itself closely to the funnel and projects above the cork all round. The disc of blanket is laid on the cork, inside this projecting edge of the filter, and then another filter 3 inches in diameter, cut in toward the centre round the edge, but not so deeply as the first, is applied on top of the blanket and forms a kind of cup to receive the first portions of wetted powder. The magma should be poured in slowly at first, and into the centre of this little cup, so as to press and flow outward equally in all directions, and thus force the paper against the glass as the contents accumulate. When the magma rises above the edges of the paper it may be transferred more rapidly, and when all is carefully scraped into the funnel a larger filter—say 7½ inches in diameter and cut round the edge—is placed upon the surface and carefully pressed in contact over the surface and against the side of the funnel at the edge. A funnel and appliances thus prepared, including flasks as receivers,* is called through-

* There are few things more convenient to a practical pharmacist than a set of marked flasks from two pints down to four fluidounces, accurately measured and marked in the neck by means of a file or diamond, and carefully tared in grains and the weight scratched on the flask. They may be accurately marked by weighing into the clean, dry flask, counterbalanced on a good scale, recently boiled distilled water at 60°, 7291 grains to the pint. The French measuring flasks may also be used when the mark is higher in the neck so as to admit the other mark below for wine measure. The pint being about 473 cubic centimetres, it is only

out this paper, "a funnel prepared for percolation." The magma is scarcely transferred to the funnel before the dropping commences, and this dropping is pretty rapid at first; but with a constant and plentiful supply of menstruum on top, if the powder be very fine, the dropping rate soon diminishes to about 20 to 22 drops per minute and so continues to the end. When the prescribed 6 pints and 10 f℥. of Alcohol is used on top in this way, it happens with great uniformity that 6 pints and about 2 f℥ of alcoholic percolate can be obtained before any sign of water is seen in the percolate. If, however, the funnel has a very close cover, and the point passes well into the body of the flask, and especially if the weather be cool, all of which circumstances diminish the loss by evaporation, 6 pints and 4 f℥, or even 6 pints and 6 f℥ may be obtained before the water makes its appearance at the outlet. When it does so appear the percolation is finished, and the residue in the funnel will be found almost tasteless, except the lowest strata, and there but moderately bitter.

The point of time at which the water makes its appearance is very easily seen by the muddiness produced in the percolate. This point should be watched for, and the receiver frequently changed, to avoid getting much water into the percolate.

In the trials with these percolations to determine the point of practical exhaustion, the percolates were assayed repeatedly for alkaloids after 4 pints, after 5 pints, after 5½ pints, and after 6 pints. When the powder was fine, alkaloids precipitated by ammonia were always found, even after 6 pints, but the proportion rarely exceeded 4 grains to the half-pint. After 5 pints, the 6th pint usually gave about 1 grain of impure alkaloids to each fluidounce of the pint. The 5th pint gave a much larger proportion, and varied more.

The percolate after the 6th pint is, from Red Cinchona, almost as dark as port wine, and quite bitter. From Yellow Cinchona it is sherry wine colored, and quite bitter.

necessary to take out from an accurately filled half litre flask, 27 cubic centimetres, and mark this new level lower in the neck, in order to have a standard for both the new and old measures. A single flask carefully made serves to make others by, and a set of such standards once established soon become indispensable.

This percolation occupies about forty-eight hours, but requires little or no attention if the funnel and receivers be large enough.

A very considerable economy in alcohol may be effected when larger quantities of Cinchona are percolated, by a method called by the writer Repercolation. This consists in percolating one portion of the powder with the percolate from a previous portion. This method will be briefly described in some of the formulas of this paper; but for a detailed description, and the interesting results of some experiments and much practice, reference must be made to a paper to be presented at the approaching annual meeting of the American Pharmaceutical Association. The paper is entitled, "Repercolation applied to the Cinchonas, as a method of economizing Alcohol in the exhaustion of drugs."

In order to recover the alcohol from the percolate, a small water-bath still and condenser is necessary. One the inner vessel of which holds 4 pints, is very convenient, but that used by the writer for many years past holds only two pints, and is quickly and easily managed over a small table gas burner. The weight of this vessel should be indelibly scratched on it. From the 6 pints of percolate 5 pints 4 f℥ is usually recovered before the dropping becomes too slow to compensate the time and fuel, and the alcohol so recovered is of a proper strength to be used at once for a fresh portion of Cinchona. The Cinchona odor, however, unfits it for most other uses. The head of the still is then removed, and a weighed stirrer, with a somewhat broad flattened end, introduced. The thin rich-looking liquid extract usually measures about 4½ to 5 f℥. when the head is removed, and this, by about ten minutes' active stirring on the bath, is easily reduced to four troyounces. The shape of the end of the stirrer has very much to do with the rapidity and facility of this part of the process, and if a rod be used, the time required is much longer. The weight of the still and stirrer being known, it is easy from time to time to set the vessel on a scale until the proper weight, or near it, is attained. The troyounce of Glycerin is most conveniently added while the vessel is sitting on the scale, care being taken not to pour in too much. The vessel is then replaced in the water-bath, and heated until the Glycerin becomes sufficiently hot and fluid to dissolve the extract, and the

stirring is continued until a perfectly uniform mixture is obtained. During this heating and stirring there is always an additional loss of weight, which should be disregarded, or made up with a little alcohol, according to the consistence of the extract and the richness of the Cinchona. In order that 1 grain of the extract should represent exactly 3 grains of the powdered Cinchona, the total extract must weigh 5ʒ. 160 grs. But it is quite near enough, and usually makes a better consistence when the extract weighs 5ʒ. or a little less. With the quality of Cinchonas used by the writer, and the Glycerin of full officinal strength, this extract when hot is thin enough to be easily managed and transferred to pots (the inside surfaces of which should be moistened with Glycerin) with facility, and when cold is firm enough to be rolled into pills which retain their form for a short time pretty well, even in warm weather.

(To be continued.)

GLEANINGS FROM GERMAN JOURNALS.

By J. M. Maisch.

On the Quantity of Fibrin separated from Blood. Dr. Sigmund Mayer obtained the blood from the carotis of a dog through a forked tube. The fibrin was washed with water, exhausted with boiling alcohol, dried between 110° and 120° C., and weighed. The results of his experiments are as follows:—

1. Two portions of the same blood, treated precisely alike, may yield equal or different quantities of fibrin.

2. These irregularities occur whether the blood coagulates quietly, by beating or shaking.

3. The same is the case, whether the rapidity of coagulation is increased by heating in a water bath to 45° C., or delayed by immersing in ice.

A sufficient explanation of this behavior cannot be given; it seems to support the hypothesis of Al. Schmidt, that variable quantities of fibrino-plastic matter, of which blood contains an excess, enters into the formation of fibrin.

The author corroborates the statements of others regarding the great variations in the amount of fibrin yielded by the blood of different individuals.

When large quantities of blood were repeatedly taken from dogs at intervals of from two to eight days, each successive portion of blood contained more fibrin. (Verh. d. Kaiserl. Akad. d. Wiss., 1867, xviii., 143—145.

Poisoning by Decoction of Poppy Capsules. Dr. F. L. Winckler relates a fatal case of poisoning of a babe, from whose stomach he succeeded in isolating a little morphia, but was unable to discover meconic acid. Prof. L. A. Buchner mentions a similar case of poisoning, in which he could not find any morphia in the stomach. In the case of a boy of five years, who was killed by three doses of acetate of morphia, of two grains each, no morphia could be discovered in the stomach. (Buchner's N. Repert, 1867, 35—43.

Liquid Soap. D. Aug. Vogel, Jr., recommends for this purpose Heeren's directions to saponify a mixture of 100 grammes glycerin and 32 grms. olein with 17 grms. concentrated potassa solution. To the soap, which is of the consistence of honey, add 3·5 grms. carbonate of potassa, dissolved in little water, allow to rest for some time, and decant. This soap may be mixed with, and serve as a vehicle for the external application of tannin, iodine, bromine, &c. (Ibid, 65.)

Titration of Tannin by Glue. A suitable solution of glue, which shows no tendency to decompose, is made by dissolving 16 grms. purified glue in 16 CC. water, adding 1 grm. muriatic acid and 1·5 grm. sulphate of zinc, diluting to 200 CC. and decanting; it is then measured so that 100 CC. are equal to 3 or 4 grms. tannin. (Ibid, 66.)

Constituents of the Bark of the Apple-tree Root, by Rochleder. The sugar of lead precipitate in the decoction of the bark is partly soluble in acetic acid. If the insoluble portion is treated with HS, and the filtrate evaporated, in vacuo, to a syrupy consistence, alcohol leaves pectin behind, and its solution, after distilling in vacuo, and evaporating over sulphuric acid, yields a small quantity of crystals of the composition $C_{48}H_{30}O_{54}$, probably $4C_{12}H_8O_{14}—2HO$. The air-dry substance must have had the composition of citric acid; it lost, on drying, 6·74 per cent. water. (Calculation 6·72.)

The acetic acid solution obtained as above yields, with Gou-

lard's extract, a small precipitate, which, treated like the former precipitate, yields more of the same crystals.

The filtrate from the last precipitate by subacetate of lead gives, with ammonia, a bulky precipitate, which, freed from lead and the water evaporated over sulphuric acid, yields crystals of the lime compound of phloretin. The mother liquor contains a modification of the tannin of the bark, which is identical with the tannin of Æsculus Hippocastanum, and undoubtedly the material yielding the phloretin, which differs by a plus of C_4H_4 from the composition of the tannin; both, on splitting, give phloroglucin. A substance, having the composition of salicylic acid, yields an acid homologous with the former.

The bark of the trunk contains a compound dyeing yellow. Ibid, 71—74.

Creasote. Prof. v. Gorup-Besanez writes: It will interest you to hear that the beechwood tar creasote, obtainable at present from Mayence, differs from the Bohemian, but is likewise not identical with phenylic acid. It agrees in boiling point, specific gravity and composition with Völckel's creasote. I am at present investigating the products of substitution by chlorine, which likewise are not chloranile.—*Ibid*, 110.

Preparation of pure Corrosive Sublimate. Prof. D. H. Fleck, of Dresden, evaporates ten pounds mercury with $1\frac{1}{4}$ its weight (12·5 lb.) concentrated sulphuric acid, evaporates carefully until a grayish-white saline mass remains behind, containing neutral and acid mercuric, and some mercurous sulphate. Nine pounds pure table salt is added, and the mixture sublimed. Sublimation begins a little above 200° C., continues very uniformly, and yields, besides muriatic acid, a dense white sublimate entirely free from adhering acid. A salt containing 7·43 parts mercurous oxide was entirely free from calomel.—*Ibid*, 116, 117, from *Journal f. prakt. Chem.*, 1866, Heft 19 and 20.

Delicate test for Lime. Sonstadt recommends tungstate of soda as the test for lime, which is as delicate as chlorides for silver, or sulphates for baryta. An excess is to be avoided, since tungstate of lime is slightly soluble in tungstate of soda.—*Ibid*, 188, from *Jahresber. d. phys. Ver. zu Frankfurt.*

FORMULAS FROM JOURNAL DE CHIMIE MÉDICALE.

The following formulas, many of which were originally published in *l'Union Médicale*, are taken from the above-named journal—1867—January to July.

Pennès Antiseptic Liquid. Bromhydric acid, two parts; pure phenylic acid, eight parts. Mix in a porcelain capsule, placed in a sand or steam bath, and stir with a glass tube. When the combination is effected, fill in small glass-stoppered vials.

Vulnerary Ointment, (*Guérit-tout des Anciens*,) by M. Perret. Arnica flowers, 50 parts; flowering tops of St. John's wort, 25; of vervain, 15; lard, 800 parts.

Antispasmodic and Antineuralgic pills of M. Rayer. Extract of valerian, assafœtida, galbanum, castor, of each, one gramme. Make into 18 pills, of which one is to be taken three times daily.

Confection of Cinchona and Sulphur in Chronic Bronchitis, by Dr. De Smet. Powdered cinchona, flowers of sulphur, of each 10 grammes; syrup of marsh-mallow, q. s. If there is no tendency to diarrhœa, the cinchona is reduced one-half. Dose: A coffee-spoonful four times a day, to be continued for two or three weeks.

Application for Neuralgia, by Dr. Gray. Tincture of aconite, chloroform, of each, five parts; lard, 20 parts. Mix. After applying the ointment, the place is covered with cotton.

Colombin in Dyspepsia, by Wittstock. The alcoholic extract of colombo is treated with water, and agitated with an equal volume of ether. The etherial solution is drawn off; the greatest part of the ether distilled off; the last allowed to evaporate; the crystals are washed with cold ether, and dried. Dose: Five to fifteen centigrammes a day.

Copland's Compound Confection of Cinchona. Powdered Calisaya bark, 30 parts; confection of rose, 15 p.; dilute sulphuric acid, 3·75 p.; ginger syrup, 45 p. Dose in intermittent fever: Four to eight grammes three or four times a day.

Chloroform Water (*Eau Chloroformée*). Distilled water, 200

grammes; chloroform, two grammes. Agitate well. For external application in cephalalgia, besides sinapisms.

Odontalgic Drops of Righini. Alcohol, 8, creasote, 12, tincture of cochineal, 4 grammes; oil of mint, 6 drops. Mix.

Odontalgic Drops, of Copland. Opium and camphor, of each, 60 centigrammes; alcohol, q. s., (?) to dissolve; oil of cloves and of cajeput, of each, four grammes. Mix. To be applied with cotton.

Powder for Destroying Warts, by Hunter. Powdered savine and verdigris, equal parts. Mix.

Teething Syrup, of Delabarre. Fresh juice of tamarinds (pulp ?) 3 grammes; infusion of saffron, (made of 6 centigrammes,) 2 grms.; clarified honey, 10 grms.; tincture of vanilla, 25 centigrammes. Mix. To be rubbed on the gums.

Electuary of Sulphur in Habitual Constipation. Washed sulphur, 30, cream of tartar, 15, white honey, 90 parts. Mix. Dose: A coffee-spoonful once or twice a day.

Plasma of Oxide of Zinc, (*Glycéré d' Oxyde de Zinc*—Rollet.) Glycerin, 16 grammes; starch, 8 grms. Heat carefully until a gelatinous mass is formed; then add oxide of zinc, four grms.

Velpeau's Black Caustic. Triturate, in a porcelain mortar, 30 grms. powdered liquorice root, and add sulphuric acid in small quantities until a mass of suitable consistence is obtained, which must be neither too hard nor too liquid. This preparation forms a well-marked hard black eschar.

Mayet's Syrup against Diarrhœa. Powdered gum-arabic, 15 grms.; distilled cinnamon water, 15 grms.; distilled mint water, 10 grms.; syrup of quinces, 20 grms.; extract of opium, 5 to 10 centigrammes. Dissolve the gum in the syrup, add gradually the distilled waters, and finally dissolve the extract of opium.

Thus prepared, the syrup will keep for a long time. Mixed with half a tumbler of water, it forms an astringent potion, of which a tablespoonful may be taken every hour in cases of diarrhœa accompanied with colic.

J. M. M.

ON PYROPHOSPHORIC ACID.

By Dr. J. H. Gladstone.

According to Graham's original view of the constitution of this acid, when regarded as $2HO,PO_5$, it was believed to be a bibasic acid. Since the atomic weight of oxygen has been doubled, its formula is written $2H_2O,P_2O_5=P_2H_4O_7$, and it becomes a tetrabasic acid. The correctness of the latter view receives support from the existence of amides containing one, two, and even three molecules of NH_2 in the place of HO. The present paper treats of some normal pyrophosphates, and certain allotropic modifications of these salts, and indicates the constitution of the acid as deduced from several modes of formation. The author confirms Schwartzenberg's analysis of the ferric pyrophosphate, $P_2fe_4O_7+3H_2O$,* and suggests the existence of a soluble double salt $P_2Na_2fe_2O_7$. The cupric salt was found to have a similar composition, but contained only two atoms of water. Dr. Gladstone mentioned some remarkable facts tending to establish the existence of an allotropic ferric pyrophosphate. Thus, if a solution of sodium pyrophosphate be mixed with a large excess of sulphuric acid, and ferric chloride then added, there is no precipitate in the cold; but, on heating, a white flocculent compound is formed, which differs from the ordinary modification of that substance by being insoluble either in dilute mineral acids, ferric chloride, or in alkaline pyrophosphates. A quantity of this substance was prepared and analyzed. Its composition was found to be identical with that previously recognized—viz., $P_2fe_4O_7,3H_2O$. It is proposed to use this reaction as a test for the acid in question. Similar results were observed in the case of copper. Regarding the modes of preparation, it was stated that the pyrophosphates had hitherto been obtained by the action of heat upon the orthophosphates, but Dr. Gladstone succeeded in producing them by dissolving phosphoric anhydride in an alcoholic solution of hydrate of potassium or other alkaline base; or, if the oxychloride of phosphorus be dropped into a strong aqueous solution of the same hydrate, the product was identical. That this

* Ferricum (fe) = 18·66. (Williamson.)

result is true in the case of the strongest ammonia, had been previously shown. The author concluded by tracing the formation of pyrophosphoric acid in stages, as follows:—

I. $PCl_5+H_2O=PCl_3O+2HCl$.

II. $2.\left\{\begin{matrix}Cl\\PClO\\Cl\end{matrix}\right\}+H_2O=2HCl+\left.\begin{matrix}PCl_2O\\PCl_2O\end{matrix}\right\}O$

III. $\left.\begin{matrix}PCl_2O\\PCl_2O\end{matrix}\right\}O+4H_2O=4HCl+\left.\begin{matrix}P(HO)_2O\\P(HO)_2O\end{matrix}\right\}O$

Pyrophosphoric acid, $P_2H_4O_7$.

—*Lond. Chem. News*, June 28, 1867.

OBSERVATIONS ON THE ALTERATION OF THE FREEZING POINT IN THERMOMETERS.

By Dr. J. P. Joule, F.R.S., V.P.

Having had in my possession, and in frequent use, for nearly a quarter of a century, two thermometers, of which I have, from time to time, taken the freezing points, I think the results may offer some interest to the Society. Both thermometers are graduated on the stem, and are, I believe, the first in this country which were accurately calibrated. Thirteen divisions of one of them correspond to one degree Fahrenheit. It was made by Mr. Dancer, in the winter of 1843—44. My first observation of its freezing point was made in April, 1844. Calling this zero, my successive observations have given

0 April, 1844.
5·5 February, 1846.
6·6 January, 1848.
6·9 April, 1848.
8·8 February, 1853.
9·5 April, 1856.
11·1 December, 1860.
11·8 March, 1867.

The total rise has been, therefore, ·91 of a degree Fahrenheit. The other thermometer is not so sensitive, having less than four divisions to the degree. The total rise of its freezing point has been only ·6 of a degree; but this is probably owing to the time which elapsed between its construction and the first observation

being rather greater than in the case of the other thermometer. The rise of the two thermometers has been almost identical during the last nineteen years.—*Lond. Chem. News*, May 17, 1867.

CRYPTOPIA, A NEW ALKALOID DISCOVERED IN OPIUM.

By T. and H. Smith.

There are now known to exist in opium nine undoubted principles with markedly distinguishing characters:—morphia, codeia, papaverine, narcotine, thebaia, nareeine, meconine, meconic acid, and thebolactic acid.

In the multiplicity of its constituents and in its wonderful action, as well salutary as deleterious, upon the living animal system, opium takes, *par excellence*, the highest place amongst all the products of the vegetable kingdom of nature. If it should be objected that the greater part of the principles yielded by it may really be the result of the varied manipulations necessary for obtaining them, the wonder is not in the least diminished, unless, which is very far from being the case, anything like an equal number of principles of equally marked characters may have been found in any other production of vegetable nature.*

It is long since it became a conviction in our minds that the long and wonderful list of opium products does not exhaust the number which this drug might still conceal, but which may be ready to be revealed by some happy chance to the chemist possessed of sufficient opportunity for the research. In proof that

* It must not, in this connection, be overlooked that in none of the processes for obtaining the different principles of opium are the chemical actions of a very powerful nature. They consist in a few precipitations, solutions in acids, not generally more than neutral, and, in addition, the use of various solvents, such as water, alcohol, and ether, and a moderate heat. When the principles, pure and in a separate state (the remarkably ready change of meconic acid into comenic acid forming an exception), are subjected to such operations and conditions, the only result is a more or less great degeneration or destruction of the body. When more powerful agents, such as strong acids, alkalies, chlorine, or a strong heat, are used, the principles of opium, like all other organic bodies, are changed into other substances almost endless in number.

our preconception was not erroneous, we are now able to add another well-marked body to the list already admitted. The new substance is an organic alkaloid; its alkaline character is strong and decided, perfectly neutralizing the strongest acids, and forming salts. The sulphate, muriate, nitrate, thebolactate, and acetate have been produced by us,—these all crystallize in beautiful and distinct forms.

The salts of cryptopia,—a name which we have given to the subject of this paper,—especially the muriate, have a remarkable tendency to form a jelly. In this tendency they are distinguished from all the other salts of the opium alkalies, and, so far as we are aware, from most of the other organic salts. The salts of aricina form, as far as we remember, the only example of the existence of such a character. If the muriate of cryptopia be dissolved in from ten to twenty parts of hot water, the solution sets into a crystalline mass on cooling; but if the quantity of water should amount to about thirty parts, the liquid, on being set aside, instead of crystallizing, forms a jelly, which differs in appearance from pure gelatine only by being somewhat less transparent. If the jelly be now evaporated in a shallow vessel at a smart heat, it dries up into transparent horny shavings, which by continued heat become short and brittle; but if the heat of evaporation be only about 100° F., it crystallizes in flattened, striated tufts, radiating very prettily from a centre or taking fringe-like forms, and gives about $\frac{1}{32}$ of its previous weight.

In the gelatinous state the muriate of cryptopia behaves somewhat eccentrically, sometimes retaining this condition for an indefinite period, and at other times running into crystalline knots, which are then seen floating in a clear watery liquid. The muriate of cryptopia, and also, we have reason to believe, its other salts, has a character which peculiarly distinguishes it from the muriates of the other opium alkalies: for instance, if the muriate of morphia or codeia be dissolved in a quantity of hot water, such as to give a crystallization of the salt on cooling, if the resulting salt be dried by the use of bibulous paper and exposure to a gentle heat, the bulk of the salt hardly changes, and remains in a state loose and easily broken up; with muriate of cryptopia

the result is very different, the crystalline mass gradually shrinks, and by the time of complete desiccation it is found to be quite tough, and diminished in bulk to an extraordinary degree; if, on the contrary, the liquid be removed by means of a strong press, the resulting cake is tough like parchment, so as to be powdered with very great difficulty. We have not observed this character in any other salt of the opium alkalies. The crystallization of muriate of cryptopia, while lying in the liquid from which it had crystallized, is sometimes exceedingly beautiful, but on being slowly dried up, its crystalline appearance almost ceases to be seen by the naked eye; but may be again easily brought out by moistening the mass for a short time with hot water; the effect is very striking.

Under various circumstances this salt yields very fine crystals, but very different both in form and appearance from those produced in the last mother-liquids of the muriate of thebaia, in which it was first observed by the manager of our chemical works, Mr. J. Smiles, who drew our attention to the beautifully light, delicate, floating, leaf-like, and silky crystallization which it presented. This was so different in appearance from that of any other opium products with which we had hitherto been acquainted, that we felt assured of the novelty of the substance. It may not be uninteresting to remark, that in addition to its beautiful appearance, the new substance presented a feature which has been a characteristic of narceine alone of all the other principles of opium, that, namely, of crystallizing nearly colorless out of an almost black liquid. The muriate of cryptopia is much less soluble in water than the muriate of morphia. A saturated solution of the former gives only nine grains on the evaporation of a fluidounce, while the same quantity of a like solution of the latter gives three times as much. The solubility of the two salts is reversed when spirit is used as the solvent, showing that muriate of cryptopia is more soluble in spirit of wine than muriate of morphia.

Cryptopia is colorless and odorless; its salts have a taste at first bitter, but the bitterness is soon followed by a peculiar coolness, which spreads over the tongue and palate, as if there had been an addition of some peppermint. It leaves no ash

when burnt. Heated in a glass tube it remains without apparent change till the heat rises to about 400° F.; it then melts into a liquid which, on raising the heat, assumes a dark color; on cooling it becomes solid at about 340° F., and, according to the quicker or slower cooling, forms a splintered resinous-like layer, or draws into lichen-like tufts, which show a radiated crystalline structure when examined by means of a lens. When cryptopia is gradually heated to redness in a closed glass tube, it melts, blackens, gives off a watery vapor, which condenses on the cold sides of the tube; whitish-yellow vapors make their appearance, but quickly disappear; and, although there is a creeping up in the tube of an oily liquid, there is nothing to indicate sublimation. The liquid condensed in the tube at once turns reddened litmus-paper blue; the fumes from the tube have an ammoniacal smell, and a glass rod moistened with weak hydrochloric acid, when passed into the tube is immediately surrounded with a white cloud. The alkaloid appears to be soluble neither in oil of turpentine nor in benzine, but is nearly as soluble in chloroform as narcotine.

PREPARATION.—Cryptopia is contained in the weak spirituous washings of crude precipitated morphia, the liquid designated by the French, "eaux mères alcooliques."

The first step to be taken is to neutralize the liquid with diluted sulphuric acid, keeping it rather below than above the neutral point; the spirit is then to be recovered by distillation, and the contents of the still washed out with abundance of hot water; the washings and liquid are to be mixed together and filtered, the hot liquid is now to be thrown down with a large excess of caustic lime in the form of a milk; the liquid is next to be filtered away, and the precipitate thoroughly washed,—the washed matter, more or less loose or pitchy, is the source of cryptopia. The very compound matter thus obtained is to be boiled up with rectified spirit in large quantity, and the spirituous solution filtered; the filtered solution is then distilled to recover the spirit. After the spirit has been removed, the contents of the still are found to be a watery liquid, and a solid matter of a pitchy consistence. The watery liquid is then removed, and the pitchy matter, which is principally composed of thebaia, is

next to be heated to ebullition with enough of rectified spirit to dissolve the substance. The solution having been put aside will be found by the following day to have crystallized, turning the liquid into a soft solid, in consequence of the abundant crystallization of thebaia. The mass, after complete crystallization, is to be strongly pressed in a cloth, and the solid cake powdered and dissolved in muriatic acid very much diluted; care being taken not to go beyond the neutral point. The filtered liquid is then to be evaporated so as to obtain a crystallization of muriate of thebaia; the mother liquid, separated from the first crop of crystals, is further carefully evaporated, at a heat not too strong, for a second crop of crystals of muriate of thebaia; and if everything has been properly done, after the muriate of thebaia has crystallized, in the course of some weeks the muriate of cryptopia will make its appearance, and may be readily recognized by the characters already detailed, and which cannot allow of its being mistaken for muriate of thebaia. When the new body has fully separated in a crystalline form, it becomes a question how it is to be obtained apart; for, although it appears to be very abundant, yet from its extreme lightness and tenuity it is exceedingly small in quantity. The crystallizations of the muriate of thebaia and the muriate of cryptopia, not being separated by an abrupt line of division, but the one shading into the other, the separation of the new body is not by any means easy.

The first quantity of the salt obtained by us, and the alkaloid from that salt, which, through the kindness of Mr. Brady of Newcastle, we had the honor of submitting to the first meeting of the Pharmaceutical Conference of Bath, was obtained by a tedious operation of careful floating off and re-crystallization.

When the substance had been obtained as pure as possible in this way, it was found, on pure sulphuric acid being added, to give a purple color, thus showing it not to be a salt of thebaia, but in all likelihood to be rather characteristic of a new substance belonging to opium. Afterwards, however, on boiling the precipitate produced, by the addition of ammonia to its solution, with strong rectified spirit, a crystallization was deposited on the sides of the glass, which, with strong vitriol, gave a deep blue color with a tinge of violet; while, on the other hand, the mother

liquid gave an alkali which, with strong sulphuric acid, gave at once the deep blood-red color characterizing thebaia. The salt which had given the purple color had therefore been a mixture of the two salts, of the muriate of thebaia and the muriate of cryptopia, the red and blue of the mixed reactions having, of course, given a purple. It is our belief that the salt, as obtained from the mother liquid of muriate of thebaia, is a chemical compound of the two salts; nor does this belief seem unreasonable, for, on making the muriate of cryptopia with the pure alkaloid, we have never been able, by repeated crystallization, to get it in such a state as to give other than a blue color with sulphuric acid, nor to produce crystals at all similar to those in question. It soon became quite clear to us, that in order to obtain the new substance in a quantity sufficient to enable us to investigate its nature more closely, it would be necessary to devise some better method than the one explained. This was the plan we adopted. The hard pressed cakes of the last crystallization of a number of preparations of muriate of thebaia were dissolved in as small a quantity of boiling water as possible, and the liquid filtered hot. On cooling, we found the liquid to have crystallized, not in hard stony crystals like those of muriate of thebaia, but in a softer state, and generally in cauliflower-like masses. The whole was then subjected to strong pressure, and a portion of the solid cake, after being dried and powdered, we boiled with rectified spirits in the proportion of one to five. The liquid we filtered hot; and the mother liquid, after perfect crystallization (the full quantity of liquid being kept up by the spirituous washings of the crystals of muriate of thebaia obtained by previous crystallization), we again boiled with the same quantity of the crystalline cake as before. These operations we repeated as long as the crystals yielded gave an unmixed hard crystallization; but by-and-by, perhaps after six or seven crystallizations, the muriate of cryptopia accumulating more and more, we found that a whiter crystallization, in soft tufts, formed on the surface of the hard mineral-like muriate of thebaia. Whenever this appearance presented itself the mother liquid was poured off into an open vessel, and as the spirit evaporated the whole liquid set into a soft mass. (This takes place spontaneously, sometimes when

stirred.) Next day we threw the soft mass upon a cloth and pressed out the liquid. The cake left was almost pure muriate of cryptopia.

The salt can be very easily rendered colorless, by crystallization and a small quantity of pure animal charcoal. It is not unworthy of remark, that the bleaching effect of charcoal is much more marked in the case of the salts of cryptopia than in those of the other alkaloids of opium.

There is no difficulty in knowing if the salt obtained is mixed with thebaia. If the minutest particle gives a blue color with sulphuric acid, it is pure; but if it give the least tinge of purple, it still contains thebaia. To obtain the pure alkaloid it must be precipitated from its watery solution by ammonia, and the precipitate, after washing and drying, is to be washed freely with ether or spirit, either of which dissolves the thebaia readily, but has little action on the cryptopia.

The crystallized alkaloid is prepared by boiling the precipitated alkali in rectified spirit, and, as its solubility in spirit is very small, a large quantity of spirit must be used. The alkaloid crystallizes after cooling, and on being allowed to remain undisturbed for some time. The crystals, which are partly separated on the sides,—partly, and in greatest quantity, at the bottom,—are very minute, but by the aid of a powerful magnifying glass are found to be composed, especially on the sides of the glass, of beautiful groups of transparent six-sided prisms. The crystals given by twenty ounces of rectified spirit, saturated at a boiling heat, do not weigh more than sixty grains; and a thousand water grain measures of the spirituous mother liquid, after complete crystallization, only give, on evaporation, a weight of 0·79 grains, so that cryptopia requires the large quantity of 1265 parts of cold rectified spirit for solution.

The quantity of cryptopia yielded by opium is very small indeed: we have only got, altogether, since it first came under our notice, about five ounces, in the form of muriate; and to obtain that quantity not less than four or five tons of opium have been operated upon; we do not suppose the whole of the cryptopia contained in the opium to have been obtained by us; but still there can be little doubt that the new alkali is, of all the con-

stituents of opium, the smallest in quantity. An observation made by us quite recently shows, although we cannot say to what extent, that the quantity obtained does not show the full proportion existing in opium. It occurred to us that, as the cryptopia had been obtained from the thebaia crystallized from spirit, the spirituous mother liquid, which had been pressed out, ought to be a source of cryptopia; and an examination of a quantity of this liquid, which had been lying aside for some years, completely confirmed our idea. That liquid we found to have become quite gelatinous; and from our acquaintance with the peculiar character of the tendency of the salts of cryptopia to gelatinize, we were led to examine more closely the gelatinous mass. A Stanhope lens showed it to be composed of an infinity of minute crystalline needles. It was exceedingly difficult to separate the crystals, and we only succeeded by a slow filtration of some weeks, and at last by cautious pressure by means of a cloth. When the pressed and powdered mass had been boiled with rectified spirit, a crystallization was obtained from the filtered spirit. On washing the crystals two or three times with a little cold spirit, and then drying them, the blue reaction with strong sulphuric acid at once proved the crystals to be really cryptopia;* and the proof was strengthened by neutralizing the crystals with very dilute muriatic acid, when the characteristic jelly was formed by evaporation and cooling.

Cryptopia, being a strong alkali, cannot be mistaken for the principles of opium of an acid nature, such as meconic and thebolactic acids; nor for those that are neutral or of weak alkaline properties, such as meconine, narceine, narcotine, and papaverine; the other principles of opium, viz., morphia, codeia, and thebaia, are strong alkalies, neutralizing the strongest acids. As cryptopia possesses this character of strong alkalinity, in common with the three principles last mentioned, nothing more will be necessary than to contrast its other characters with theirs, to find to what extent these characters separate it from them, and

* We are not quite in a positon to affirm that the cryptopia obtained from the pressed crystalline cake had been given by the crystals seen by aid of the lens, or by something else that had existed side by side with them: we intend trying to determine this point, and hope to succeed.

give it a right to be considered a substance not hitherto known to exist in opium.

The very sparing solubility of cryptopia in spirit separates it widely even from morphia, the least soluble of the other alkaloids in that medium. The insolubility of cryptopia in ether does not distinguish it from morphia, but does so completely both from codeia and thebaia.

The action of strong sulphuric acid (pure) on cryptopia cannot allow of its being confounded with any of the other three. This acid produces a blue color with the most minute quantity of cryptopia; a blood-red with thebaia; and no color with either morphia or codeia.

The salts of cryptopia have a great tendency to give jellies on cooling from hot solutions. None of the others show this tendency. The muriate of cryptopia crystallizes in tufts, but of a different kind from those of muriate of morphia and muriate of codeia; while the muriate of thebaia crystallizes in hard, stony-like crystals. Again, the muriate of cryptopia is much more easily bleached with charcoal than either of the other muriates.

It appears to us unnecessary to carry the comparison further; we think we have said enough to show a difference of characters so distinct as to prevent the chance of cryptopia being confounded with any of the other principles of opium.

It is already known that a blue color is produced by the action of vitriol on papaverine, but the shade of blue is far more faint, and passes into an orange on the addition of a minute particle of powdered nitre. By the same addition to the blue of cryptopia green is produced. A faint green can also be produced by the addition of nitre to the blue of papaverine; but it is very faint, and requires careful management to produce it.*

* The rationale of the production of the green color is easily comprehended. Sulphuric acid producing a blue and nitric acid an orange yellow; when the two reactions are applied consecutively to one and the same quantity of cryptopia, the compound result is the production of a green color; and as the action of nitric acid is more powerful than that of sulphuric acid, if the quantity of nitre added should be more than sufficient, the yellow would so predominate as to overwhelm the blue reaction of the sulphuric acid; in this case, however, we never failed in bringing

If the color reactions were the only means of distinguishing cryptopia and papaverine from each other, they might be mistaken, the one for the other; but differing so much as has been shown in other respects, such a mistake is quite impossible.

As there is some analogy between cryptopia and the substance occasionally found in opium by Pelletier, and named by him pseudo-morphia, it appears to us right to point out a few features in which they differ so much as to show them to be quite distinct substances. They are both very insoluble in alcohol and in ether: in this respect they are analogous, but hardly so in any other; for instance, the pseudo-morphia separates from an acid liquid, while in such a case cryptopia could not separate.

Pseudo-morphia is insoluble in ammonia, but very soluble in caustic fixed alkalies; cryptopia, although insoluble in ammonia, is equally so in caustic mineral alkalies.

Diluted acids favor a little the solution of pseudo-morphia, but there are marked differences in this respect, sulphuric and nitric acids dissolving very little, muriatic acid sensibly more, and acetic acid much more. Cryptopia dissolves readily in any one of these acids.

Concentrated sulphuric acid turns pseudo-morphia strongly brown, and then decomposes it. Cryptopia is turned blue by the same agent, and so far from being thus decomposed, if the vessel used for the reaction be left exposed to the air, the color disappears by dilution of the acid, through attraction of moisture. If the liquid, next day, be poured off, and a fresh quantity of strong acid again added, the blue color is reproduced; and the same result may be brought out three or four times successively, the blue, of course, becoming more and more faint each time.*

Concentrated nitric acid turns pseudo-morphia red, passing into yellow, exactly as in the case of morphia. Cryptopia is colored yellowish-orange, and the color does not change.

out the green by the addition of a minute quantity of cryptopia to the yellow liquid. The green is of a deep grass shade, and has a remarkable resemblance to that which is observed on heating meconine with slightly diluted sulphuric acid, and which is so highly characteristic of that substance.

*After the coloring action of vitriol on cryptopia has been exhausted, it will be found by calculation to have been really enormous.

Pseudo-morphia, like morphia itself, becomes of an intense blue with salts of the peroxide of iron, particularly with the perchloride. When cryptopia is submitted to the same reaction, it shows no change.

Through the kindness of our friend Dr. Cook, Demonstrator of Chemistry, King's College, we are enabled to subjoin the following analytical results :—

ANALYSIS OF CRYPTOPIA.

C = 12. O = 16.

The alkaloid, dried first under the air-pump for some hours, and then in a water-bath kept at a temperature of 212° F., lost no weight.

I. 3·25 grs., burnt with oxide of copper, with a layer of metallic copper turnings in front, gave 8·33 CO_2 and 1·98 H_2O, equal to 70·00 per cent. C and 6·77 per cent. H.

II. 4·7 grs., burnt in the same manner, gave 12·08 CO_2, and 2·88 H_2O, equal to 70·2 per cent. C and 6·8 per cent. H.

III. 5·32 grs., burnt in a similar manner, gave 13·56 CO_2 and 3·15 H_2O, equal to 69·5 per cent. C and 6·76 H.

IV. 5·45 grs. alkaloid, when burnt with soda-lime, and the ammonia absorbed by standard acid, which contained 20·96 grs. SO_3 per 1000 fluid measures, were found to have neutralized an amount of acid equal to 28 measures = ·2054 N = 3·77 per cent. N.

V. 5·9 grs., treated in a similar manner, were found to have neutralized acid equal to 30 measures = ·22 N = 3·73 per ct. N.

The above figures indicate the formula ($C_{23}H_{25}NO_5$).

	Theory.		Experiments.				
	Eq.	Per ct.	I.	II.	III.	IV.	V.
C_{23}	276	70·00	70·00	70·20	69·5		
H_{25}	25	6·33	6·77	6·8	6·76		
N	14	3·50				3·77	3·73
O_5	80	20·17					
	395	100·00					

[The chlorides and platinum salt have the following composition: Bichloride, $C_{23}H_{25}N\,O_5,2H\,Cl + 6H_2O$.

Chloride, $C_{23}H_{25}NO_5$, $HCl + 5H_2O$.

Platinum salt, $(C_{23}H_{25}NO_5, HCl)_2PtCl_4$.

Mr. Brady, of Newcastle, writes in regard to the crystalline forms assumed by cryptopia:]

"The alkaloid itself has much better defined crystalline forms than any of its compounds. Its primary form is a hexagonal prism, and it is obtained in this condition if crystallized slowly in a tube from its alcoholic solution. But if a warm alcoholic solution be allowed to evaporate on a slip of glass, it takes the shape of very thin hexagonal plates, the minute crystals resembling uric-acid lozenges."—*Lond. Pharm. Journ.*, April and June, 1867.

ON THE SUBLIMATION OF THE ALKALOIDS.

By William A. Guy, M.D., F.R.S., F.R.C.P.,
Professor of Forensic Medicine, King's College, London, etc.

In the year 1864, Dr. A. Helwig, of Mayence, first proposed the sublimation of the alkaloids as a test and diagnostic,* and more recently (in 1865 †) he published a work in large 8vo, of which the greater part is devoted to the tests for the poisonous alkaloids—morphia, strychnia, brucia, veratria, atropia, aconitine, solanine, digitaline, conia and nicotia. In the case of the fixed alkaloids, the results of sublimation and the reactions of the sublimates are minutely described. The work contains carefully-prepared tables of the reactions, and is enriched by no less than sixty-four micro-photographs, of which thirty-eight represent the crystalline forms of the alkaloids and their salts with various reagents, and fourteen are devoted to sublimates and their reactions.

Dr. Helwig states that the idea of submitting the alkaloids to sublimation first suggested itself to him as a natural extension

* Fresenius's "Vierteljahrschrift für analytische Chemie," 1864, i.

† "Das Mikroskop in der Toxikologie. Beiträge zur mikroskopischen und mikrochemischen Diagnostik der wichtigsten Metall- und Pflanzengifte, für Gerichtsärzte, gerichtliche Chemiker und Pharmaceuten, mit einem Atlas photographirter mikroskopischer Präparate. Von Dr. A. Helwig, pract. Artze und Grossherzoglich-Hessischem Kreiswundarzte in Mainz." 1865.

of a method so successful in detecting and identifying minute quantities of arsenious acid and corrosive sublimate; and he lays claim to originality, inasmuch as he does not find the sublimation of the alkaloids described in any handbook of chemistry or forensic medicine, even the most recent. This claim to originality is, I believe, fully justified, though probably every manufacturing chemist must have recognized the fact that some, at least, of the alkaloids are sublimed by heat, and experimenters on the small scale must have observed that the alkaloids, as a class, after melting, and before depositing carbon, give out a more or less dense vapor or smoke, which, if allowed to settle on a cool surface, might possibly present, under the microscope, characteristic appearances.

This new application of the test of sublimation suggested itself to Dr. Helwig after becoming acquainted with the simple methods of obtaining sublimates of arsenic and mercury on flat surfaces, with a view to microscopic and chemical examination, which I proposed in the year 1858.* His own method of procedure with the alkaloids is as follows:—In a piece of platinum foil of moderate thickness, a small cup-like hollow is formed; in this a minute quantity of the alkaloid is placed, and over it a microscopic slide (*Objectträger*). This simple apparatus being placed on a suitable support, the flame of a spirit-lamp is cautiously applied until the alkaloid melts, from which point of time the sublimate begins to form on the glass slide.

Now, this mode of procedure is obviously open to objection. The successive changes that take place in the alkaloid—the discoloration, the liquefaction, the deposit of carbon, either on the spot (as happens with some alkaloids) or over a wide surface traversed by the liquid (as in the case with others)—cannot be distinctly seen, and some diagnostic marks of the alkaloids as a class, and among themselves, are thus lost. Nor, again, can the formation of the sublimate itself be seen and watched, as it

* On the Production and Identification of Crystals of Arsenious Acid and Crusts of Metallic Arsenic," (Beale's "Archives of Medicine," No. iii., 1858;) also "On the Microscopic Characters of the Crystals of Arsenious Acid," ("Journal of th· Microscopic Society, 1861," and "Principles of Forensic Medicine," 2d edit., 1861, p. 372.)

should be, if we would obtain satisfactory results. There is also some risk in this sudden mode of applying heat, of causing the glass, which should receive the sublimate, to break.

The method of procedure to which I should give the preference is the following:—Provide small crucible covers or slabs, or fragments of white porcelain, a few microscopic cell-glasses, with a thickness of about one-eighth of an inch, and a diameter of circle of about two-thirds of an inch, and disks of window-glass about the size of a shilling. Place the porcelain slab on the ring of a retort-holder or other convenient support, then the glass cell, and upon the porcelain, in the centre of the cell, a minute portion of the alkaloid or other white powder, or crystal reduced to powder. Then pass the clean glass disk through the flame of the spirit-lamp till the moisture is driven off, and adjust it with the forceps over the glass ring. Now apply the flame of the spirit-lamp to the porcelain, underneath the powder or crystal, and continue the heat till the powder undergoes its characteristic change and gives off vapor. Watch the deposit of this vapor on the glass disk, and remove the spirit-lamp either directly or after a short interval, as experience may determine.

These are my reasons for recommending this mode of procedure in preference to that advocated by Dr. Helwig:—By employing a flat white slab of porcelain, the heat of the lamp is applied gradually, and every change of consistence, color and position which the powder undergoes is easily observed. The ring of glass, as compared with a ring of metal, has the advantage of conducting the heat from the surface of the porcelain to the glass disk so slowly as to guard effectually against the danger of breaking, and if the powder, after melting, changes its place, the glass ring, with the disk upon it, is easily shifted. The disk of window-glass is very convenient both for the experiment itself and for the subsequent application of liquid tests. It will also bear a moderate heat, if required. The disks, however, are not essential; their chief recommendation is the facility they afford of multiplying experiments. The common glass slide, or a slip of window-glass, (as being less liable to scratch, and bearing heat better than plate-glass,) may be substituted

when only a few experiments are intended to be made.* An oblong slab of wood, somewhat larger than the microscopic slide, with a circular aperture and ledge to support the glass disk, enable us to examine the sublimate under the microscope, and a similar piece of thick cardboard, with a hole punched in the centre of it, serves for the mounting of the preparation.†

By this mode of procedure I have obtained sublimates of veratria and solanine, which correspond closely with the descriptions and photographs given by Helwig; but, in the case of strychnia and morphia, I have got very distinct and extremely beautiful crystalline sublimates (not exceptional, but as the rule,) where he has failed;‡ and though I am not yet prepared to assert positively that the strychnia and morphia sublimates can always be distinguished by their crystalline forms alone, I am able to correct the statements contained in the following passages:—

"It (the sublimate of morphia) consists of perfectly homogeneous spots of round, very sharply-defined granules, closely packed together, which, when magnified a hundred and sixty times, are transparent, but among which no trace of a crystalline formation can be discovered, (p. 9);" and "Examined microscopically, a sublimate of strychnia is not to be distinguished from a sublimate of morphia; precisely the same spots of round transparent granules, without trace of crystalline formation (p. 21)."

My object, in the present communication, is to draw attention to a new method of procedure, which, even if it should fail to realize the sanguine expectations of Dr. Helwig, will certainly

*As the disks of glass can only be conveniently cut by a revolving diamond, which few glaziers possess, it may be well to mention that they may be procured of Mr. Eade, 130 High Holborn, at a cost of two shillings the gross.

† When dealing with larger quantities (such as a grain or more) of the alkaloids, the short specimen tube may be substituted for the porcelain and microscopic cell-glass. But the results are far from satisfactory; and it would certainly be better to sublime successive small portions of a hundredth of a grain or less from the porcelain.

‡ I have also obtained very fine crystalline sublimates from the new alkaloid Cryptopia.

deserve and receive the attention of the micro-chemist and microscopist, on account of the simplicity and delicacy of the process, and the beauty of the results which it yields, directly in the sublimates themselves, and remotely in the effect of reagents upon them. The few specimens of the sublimates of strychnia, morphia, solanine and cryptopia, and of their reactions, which were shown at the late *soirée* of the Pharmaceutical Society, will, I think, justify this expectation.

I hope to be able to resume this subject on an early occasion, and to indicate more precisely the advantages which we may expect to derive from the use of this method.—*Lond. Pharm. Jour.*, June, 1867.

CHOLERA AND ITS PREVENTION.

The probability of the re-appearance and spread of cholera in this country during the present year seems to be rapidly gaining credit among those who are familiar with its former history and progress. Its prevalence in Germany, in the spring and summer of 1866, was limited to a very few districts, and it made but little impression in the chief centres of population—London, Paris or Vienna—yet it found its way to New York and other American cities, and suddenly struck down several thousand human beings, and was only arrested by the adoption of the strictest sanitary measures, prominent among which was the free use of disinfectants. In the autumn it seemed to wholly disappear, and gave us hope of its entire eradication. Since then, however, it has spread widely over a large portion of Europe—especially France, England, Germany and Italy. During the winter it was reproduced in Greece and Turkey, where it made its first appearance last year. In England hardly a case occurred during the past summer, yet in Liverpool 1700 deaths from cholera were reported after the cold fall weather set in, besides 1000 from diarrhœa and similar maladies. In December last, too, eight vessels arrived at the port of New York with cholera on board.

These facts are significant, and show that summer is not the only season when cholera may prevail, although it is usually

more active then; but even the coldest weather is not a complete check to its growth and advancement.

And the premonitions to which we have already adverted, that have been occurring in many parts of our own and in other countries during the past six months, all go to demonstrate that the disease has not yet been "stamped out," and is liable to recur on the slightest provocation. We may therefore safely assume that we are liable to a return of the disease this summer and fall, both by importation and domestic origin, for neither our great cities nor the country at large can be said to be in a condition less favorable to its prevalence than heretofore, and we know with what virulence it has broken out at various points throughout the country within the past year.

It becomes, therefore, the solemn duty of every individual, especially those on whom rest the responsibility for the sanitary condition of dwellings, hotels, schools, factories, workshops, prisons, hospitals, ships and other vessels, and all places where crowds of people assemble, to see to the adoption of measures best calculated to prevent another visitation of cholera or of any other malady that may be brought on or increased by the foul emanations in filthy and crowded localities.

In the *Reporter* for June 15th, we called attention to the progress made of late years in the control of cholera and other diseases. Prominent among the means employed for this purpose, we mentioned the use of disinfectants, and quoted from a letter of Dr. Elisha Harris to the President of the Metropolitan Board of Health, in which he spoke of their great importance, and mentioned some of the most prominent disinfectants hitherto in use. We shall also soon give a classified list of these, with directions for their proper application. The difficulty with these disinfectants, however, is their costliness. This has prevented their coming into *common use*. To be practically useful to *the people*, a disinfectant should be *cheap* as well as *good*. A laboring man should be able to go to a drug or grocery store and, for a few pennies, buy a pound of disinfectant that will neutralize foul emanations, and not merely substitute one bad smell for another.

We have heretofore, on two or three occasions, called atten-

tion to disinfectants that were sold at moderate prices, but we have lately become cognizant of a compound which possesses all the requisites of a good disinfectant, which can be sold at less than half the price of any other that has been offered to the public. It is called "The Thorough Disinfectant," and we are glad to learn that some prominent physicians and sanitarians of New York, where the inventor of the compound resides, are engaged in the laudable effort of having the formula disseminated throughout the country in a way to make it available for the purpose of a general, reliable, and, at the same time, cheap disinfectant.

As we are assured that the ingredients for its composition can be obtained in almost every locality, and at a mere tithe of the cost of other disinfectants of even less value, it is to be hoped that it will not be long ere the formula will be scattered broadcast over the land, in a way the best calculated to make the use of the "Thorough Disinfectant" universal.

Some knowledge of its ingredients and wonderful antiseptic properties, and observation of its effects, have given us a very high opinion of its value, and will lead us to do what we can to promote the introduction of this excellent article, in the belief that it will add to the comfort and elevate the sanitary condition of our households and the community generally, when it comes to be fully known.

Cholera and some other forms of zymotic diseases can be much more easily prevented than cured, and anything that will neutralize foul animal effluvia, the chief promoter of this class of diseases, is well worthy of being extensively known and used.—*Med. and Surg. Rep.*, July 6, 1867.

A FEW REMARKS UPON THE USE OF HEROIC DOSES OF STRYCHNIA IN CHRONIC DIARRHŒA, DURING THE YEARS 1862-63-64-65, IN THE UNITED STATES SERVICE.

By R. P. Kendall, M. D., Hamilton, Ills.

In June, 1862, the 15th Wisconsin left Island Ten, leaving behind them over two dozen bad cases of chronic diarrhœa. Sufficient hospital accommodations did not then exist at Columbus, Ky., and Cairo, Ills., and it was thought that they would do as

well in good tents with sufficient attention. I had occasionally used strychnia before, both alone and in combination with hypnotics and tonics, but in the usual small doses, with decidedly good results. I now commenced increasing the dose to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{3}$, and in one case $\frac{6}{7}$ of a grain. The strychnia was that furnished the United States by Reed, of Chicago. The following is the formula:

℞. Strychniæ,
Morph. sul., aa gr. $\frac{1}{4}$,
Arg. Nit.,
Ext. Belladonnæ, aa gr. $\frac{1}{2}$,
Ext. Gentianæ, q. s. ut. f. pil.

℞. Strychniæ, gr. ss.,
Morph. sul., gr. $\frac{1}{4}$,
Arg. Nit. gr. ss.,
Ext. Belladonnæ, gr. $\frac{1}{2}$, m. f. pil.

℞. Strychniæ, gr. $\frac{3}{4}$,
Morph. Sulph.,
Ext. Belladonnæ, aa gr. $\frac{1}{2}$, m. f. pil.

The specific effects of the strychnia did not manifest itself until half grain doses were reached. The larger doses were never given oftener than once a day (24 hours).

In the case where $\frac{6}{7}$ were given, the patients had no discharge for twelve hours. The specific effects were quite violent for two hours—commencing in twenty minutes after exhibition. The patients were advised of the nature of the pills before commencing their use. The result was very decidedly good in every case but one. He died at Columbus, three months after. The time for establishing convalescence was variable. In the case of the patient who took $\frac{6}{7}$, convalescence was established within five days. In nearly all the cases, after cure commenced, recourse was had to the smaller doses, once every six, eight or twelve hours, according to the requirements of the case. The variations in the formula were made with a view to determine their comparative value. All were satisfactory; but those containing arg. nit. were considered more decided and permanent in effect.

The combination of morphia and belladonna can be carried to

an extremely large amount of each, producing a powerfully tranquilizing effect, without even, in some cases, causing sleep.

The strychnia was also used in substance to the extent of $\frac{1}{4}$ and $\frac{1}{3}$ grain doses while I was surgeon of the 11th U. S. C. I., at Memphis, in 1864–65. The effect was good, but not so permanent as the pill formula.

I will here relate a singular phenomenon. Nearly all cases of chronic diarrhœa amongst the Southern blacks terminated, after a lingering illness, fatally. Nearly all cases among those from Missouri, Kentucky and Northern Tennessee terminated in complete cure. * * * * * I have never seen a case of cholera since I was a student in 1862–63, but propose to use some such treatment as already mentioned should it visit this vicinity. Discussion in reference to changes in the ganglionic system by disease and medication, I forbear. I only state a few facts.—*Cincinnati Lancet and Observer*, May, 1867.

ON THE SEPARATION OF TIN AND ARSENIC.

By Professor Wöhler.

This method is based upon the solubility of sulphide of arsenic in bisulphite of potash, which does not dissolve sulphide of tin. The mass, oxidized by nitric acid, is allowed to digest with sulphur and caustic potash till solution is complete, (or till the formation of a metallic oxysulphide, which is separated by filtration). The liquid, treated by excess of sulphurous acid, is allowed to rest for some time, and is then evaporated till two-thirds of the water and all the sulphurous acid have gone off. Filter off the sulphide of tin, and wash it, not with water, which must not be used here, but with a concentrated solution of chloride of sodium. This may be removed from the precipitate by means of a slightly acid solution of acetate of ammonia, but the liquor so obtained must not be added to the washing waters charged with salt. The sulphide of tin, when dried, may be converted into oxide of tin by roasting in contact with air. The arsenic which the liquid contains in the state of arsenious acid may be precipitated by a current of sulphuretted hydrogen.—*Lond. Chem. News*, June 14, 1867.

CARAMEL COLORS.

To the Editor of the *Chemical News*.

Sir:—Under the "Notes and Queries" in your valuable paper, (No. 387,) I happen to find one concerning caramel. Perhaps the following may be of use to your correspondent:—

The manufacture of caramel (coffee finings, as it is often termed in London,) is kept a secret on this account, that neither coffee-roasters, nor dealers in groceries, nor brewers, may have, or at least are presumed not to have, any in their possession—the Excise prohibiting it. Here in London it is made by roasting sugar of coarse description in cylinders similar to those used for roasting coffee, chicory and cocoa; this yields a very inferior preparation both for coloring as well as admixture with coffee. So prepared, it contains assamar and other pyrogenetic products which are very bitter. On the continent apples of inferior description are treated as described, yielding a product superior to that obtained from sugar. Sugar, however, is the only fit material to prepare caramel, and for this purpose the sugar is best heated in capacious roomy vessels made of copper, (in Vienna copper lined with silver is preferred,) the vessel containing the sugar being placed in an oil bath* containing a thermometer to indicate the temperature. The latter must not be below 410° nor above 428° Fahr. The heating of the sugar is continued as long as aqueous vapors are given off. The crude caramel so obtained is best purified by being placed upon a parchment paper dialyser, which is placed on water. The undecomposed sugar and intermediate compounds are thus got rid of; they dissolve out with facility, and what remains on the filter is, weight for weight, five times as strong in coloring matter as the crude caramel. While the sugar is being exposed to heat, it is preferable to stir it with a spatula.

Another mode of obtaining a pure caramel, free from bitter produce, assamar and the like,) is to heat the sugar as above, and to treat the powdered caramel with alcohol, (pure methylated spirits,) to digest it for three to four hours therewith, and repeat

* A mixture of tin and lead is sometimes used, just made so as to remain fluid at from 412° to 430° Fahr.; some bismuth is added.

this till all bitter taste is gone. An aqueous solution containing 10 per cent. of purified caramel is gummy, and forms a jelly. When a solution of caramel in water is evaporated *in vacuo*, (small vacuum pan as used in sugar refineries,) it dries up to a black shining mass, freely soluble again in water, hot or cold; but if the solution is evaporated on a water-bath to dryness in contact with air, the whole mass becomes insoluble in water either hot or cold.

A very small proportion of caramel gives to a large bulk of water the dark brown tinge known as sepia. An impure but pretty strong solution of crude caramel (*i. e.*, not purified by dialysis or alcohol—hence the term impure for the solution) is sold in London, under the name of Coffeena, in small bottles at 1*s.* per bottle, to be had in many oil and color shops in the metropolis; it is used in teaspoonfuls to improve coffee, dispensing with chicory.

I am, &c., A. ADRIANA.

London, May 7.

P.S.—Treacle is not very manageable to use for making of caramel. The sugars should be first dried at 212° Fahr. On the Continent dry glucose is sometimes used instead of cane or beet-root sugar for the purpose of making caramel.—*Lond. Chem. News*, May 17, 1867.

NOTES ON THALLIUM AND MAGNESIUM ALLOYS.

By S. MELLOR, Esq.,

Manager of the Magnesium Metal Company.

It having been suggested that if an alloy of thallium and magnesium could be easily made into wire, it might be found to burn readily, and to produce an intense bright green flame, which, from its portability, would be well adapted to some of the purposes for which a green flame is required, some experiments have been made with this end in view.

It was found that thallium alloys most readily with magnesium, and in any proportions. The alloys are very stable, and are easily worked up into wire and ribbon. Alloys containing 5, 10, 15, 20, 25 and 50 per cent. of thallium were prepared.

These all burn brightly and steadily, but the flame is smaller and the combustion slower than that of pure magnesium. The flame is cold, and the heat-conducting property of the alloy, compared with magnesium, is sensibly diminished, showing the change in the molecular construction of the metal. The smoke produced in the combustion of these alloys is more dense, and, as it curls gracefully away, it is seen to be fringed with a rather pretty dark purple tint; but the magnesium light is so very intense that it almost completely masks the thallium flame, so that it is not observable in some of the alloys—indeed, the green light is scarcely recognizable even in an alloy containing 50 per cent. of thallium.

An alloy of 5 per cent. of thallium appears to render magnesium less brittle and more ductile than pure magnesium is usually produced; but the higher alloys of thallium, say those containing 25 and 50 per cent. of thallium, are more oxidizable than pure magnesium.

The metals were put together cold in a closed iron crucible; only a slow heat was required to melt them.—*Lond. Chem. News*, May 17, 1867.

CONSOLIDATED COAL DUST.

Many attempts have been made from time to time to utilize that material known as coal-waste, which in our mining region has been thrown aside until the waste heaps, so accumulated, have threatened to rival in extent and elevation the natural mountains among which they find themselves. Such attempts have as yet, to the best of our knowledge, proved unsuccessful in a commercial point of view, in this country, though a very different result has been obtained abroad. Thus, in an article by M. L. Gruner, Ingénieur en Chef des Mines, which appeared in the October number of the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, it is stated that in France some twenty establishments are carrying on this manufacture, and produce yearly 500,000 tons; in Belgium some seven manufacturers turn out 400,000 tons, while in other countries the product, though less, is very considerable.

We have not before us the data which would render possible such a comparison as might explain the very different success attained in this country and abroad, but we know that in some cases the fault lay in the costly nature of the machinery employed, and in other cases it was to be found in the friable nature of the product obtained, which rendered its transportation troublesome and expensive. We have now before us specimens of consolidated coal-dust, labelled "Gerard fuel," and remarkable for several peculiarities, which makes us think that the process by which they are produced will not share the fate of its American predecessors. These specimens are cubical, some of them measuring about 1·5 inch on each edge, others about four inches. They may be thrown violently on the floor without sensible injury, and are thus proved to possess all requisite consistency, while their process of manufacture, which we shall proceed to describe, looks well in other respects. The coal-waste is carefully screened, by which means it is stated that 30 per cent. of good coal may be secured. The finer particles are then crushed between rollers of chilled iron, and are then mixed in a machine, much like that used for tempering clay with coal tar, steam being also admitted and flour added, according to the patent, but not found to be important in practice. From the mixer, the hot, wet, tarry dust passes into the moulder, where plungers force it into moulds with movable ends; so that, when each block has been formed, the end is raised, and a second and further push of the plunger throws out the finished cube. The cubes so formed are packed closely in iron boxes, and run into an oven, where they are heated to a temperature, which distils off as illuminating gas all the hydrocarbon of the coal tar. From all that has been published abroad on the subject, it seems that experience has demonstrated the efficiency of the following points of treatment:—

1st. The thorough pulverization and wet mixing. 2d. The use of coal tar as a cement. 3d. The baking after compression. The process just described involves these points, and certainly produces most excellent results. If, on practical trial, it shall prove to possess the last but all important requisite of economy, it cannot but render the manufacture of artificial fuel here, what

it is abroad, a regular and profitable branch of industry.—*Jour. Frank. Inst.*, July, 1867.

PREPARING MEAT FOR FOOD.

By Arthur Hill Hassall, M. D., Wimpole Street.

[An English Patent. Dated February 15, 1866.]

This invention has for its objects improvements in the preparation of meat for food. For this purpose the inventor selects the leanest joints or parts of beef, or of any other kind of meat; these he first deprives of all bone, tendon, and visible fat, and the red part or flesh is then cut into pieces of about an inch or so in diameter. These are then passed through a sausage or mincing machine, by the knives of which they are cut into small pieces and minced. The minced meat is then spread in very thin layers upon perforated trays by preference of galvanized iron; this spreading is effected either by hand labor, or it may be by a spreading apparatus attached to the mouth of the sausage machine. The trays when spread are transferred either to a drying closet heated by means of steam, or to a hot-air room or chamber (heated by flues passing through it), in either of which the meat becomes deprived of the greater portion of its water, and assumes a crisp and friable condition. Special care is taken that the meat is dried at a temperature below the coagulating point of albumen. The meat thus dried is then ground in a mill, or under mill-stones of suitable construction, after which it is passed either through sieves or a flour-dressing machine, a very fine "flour of meat" being thus obtained. This powder is now subjected to a further drying process, whereby the whole or nearly the whole of the water of the meat is dissipated. By preference, dry the greater portion, say about two-thirds of the powder, at a temperature below the coagulating point of albumen, and dry the remainder at a high temperature, say at about 160° F.; the two portions are subsequently mixed together. By thus drying a portion of the powder at a higher temperature, a superior flavor is imparted to the powder than if the whole of the powder were dried at a low temperature. For some purposes, however, the whole of the powder may at the second drying be

dried at the low or high temperature; when intended to be used for biscuits at the low temperature, and when for lozenges at the high. Part of the ground meat will not, after the first grinding, be passed through the sieves or dressing machines. This has to be ground a second and even a third time, whereby other quantities of the flour are obtained, but there is still a residue which remains in the sieve. This is of a fibrous character, and consists for the most part of gelatine, and is derived from the membranes or gelatinous portions of the meat. This is ground in a mill suitably adapted for reducing fibre, or is subjected to a temperature much above the coagulating point of albumen, whereby it is rendered more friable, so that it admits of being ground and sieved, the powder being added to the flour of meat previously obtained. Finally, the bones are crushed, and these as well as the tendons are boiled and digested, so as to remove the gelatine contained in them, and which is subsequently recovered in the manner usually practised by gelatine manufacturers, and which, when reduced by grinding and sieving to a fine powder, is added to the flour of meat. Vegetables, such as turnips, carrots, celery, onions, and herbs, are dried also at low temperatures, and for the most part below the coagulating point of albumen, and they are then, like the meat powder itself, ground and passed through fine sieves, a "flour of vegetables" being thus obtained. If the flour of meat is intended to be used for the preparation of beef-tea, add to it a little salt; if intended for soups, add all the requisite vegetables and flavorings prepared as above, and reduced to a fine powder similar to that of the meat itself, so that the cook has nothing more to do but to add the requisite quantity of water, and simmer for a few minutes, when the soup is ready for use. The flour of meat is also suitable for being used in the preparation of a meat cocoa, also in the manufacture of meat biscuits, and also, when mixed with a farinaceous matter, for a food for invalids.

By the above-described method of preparing meat there is obtained a material capable of prolonged preservation; it utilizes the beef or other meat which is usually thrown away in the preparation by the ordinary method of beef-tea, broths, and soups; it also reduces the meat to such a condition that the beef-tea

and soups made with it are infinitely more nourishing than those made in the usual manner; and lastly, it reduces the meat to such a state as that no mastication is required, and it can be readily consumed by persons with defective teeth, and by invalids generally.—*Druggists' Circular*, July, 1867.

ON THE MANUFACTURE OF CARAMEL BROWN.

By Thos. Sherlock.

Caramel brown may be prepared in a variety of ways from glucose, molasses, or cane sugar. The following process gives a uniform and perfectly satisfactory article, and after having manufactured large quantities of the color and tried several other processes, I have come to the conclusion that this is the best.

Provide an iron pan capable of holding twenty imperial gallons. Provide also an iron paddle or stirrer, flattened out broad at the end, about four feet long, and made light enough to be handled easily. Have also close at hand three or four gallons of clean boiling water. Set the pan on a ring over a fireplace, and put in half a hundredweight (56 lbs) of good ordinary raw sugar. It is mistaken economy to use the very commonest brown sugar. Light a fire under the pan, and as it burns up stir the sugar about with the paddle. The sugar gradually melts, giving out puffs of vapor, and finally becomes a viscid liquid of a light brown color. This is the first stage in the process. Only a moderate heat is required, and the melting should not be hurried. Now increase the heat gradually, stirring briskly and constantly. The liquid will become thinner and darker in color, and at length begin to boil vigorously and rise up in the pan. The whole secret consists in the management of this part of the process, and minute attention should be paid to the following simple directions. Allow the melted mass to rise up till the pan is half full; then open the fire door, throw water on the fire, and pull it out quickly. This should be done by a second person, the actual operator stirring sharply with the paddle to keep the mass in the pan. If the fire be drawn without first throwing water on it, the contents of the pan will inevitably boil over, and there will be a corresponding loss of product. Continue the stirring till the boiling subsides, and the dark brown mass lies quiet at the bottom of the

pan. If a little be now dropped on to a cold plate or piece of metal, it will solidify to a brittle lump, of a clear rich brown color, showing that the operation has succeeded. All that now remains is to add sufficient water to bring the mass to the desired consistence. The water must be boiling when added, and in very small quantities at a time. There is a considerable rush of steam as the first portions of water are stirred in, and care must be taken in using the paddle to stand clear of the hot particles projected from the pan; but after a few additions of water all this subsides, and the water may be added more freely.

The finished color is usually sent out, either as a stiff paste-like extract, in which condition it is used by saddlers, curriers, &c., for browning certain kinds of leather, or as a syrup more or less thick. In this last form it is used for coloring vinegar, spirits, gravies, and many other liquids, and is well known in the drug trade as "color fuscus." If the stiff form be required, about a gallon of water will be sufficient, and in this case the product should be got out while hot, and put into stone-ware jars, previously heated, and standing on a piece of wood.

Fifty pounds of raw sugar should yield at least sixty pounds of the stiff color, and proportionately more of the thinner kind, and when cold should dissolve readily in water, giving a clear brown solution, without deposit or turpidity.

The causes of failure in the manufacture may be either a deficiency or an excess of heat.

If the heat used be insufficient, some of the sugar remains imperfectly converted, and a muddy dirty-looking product is the result. On the other hand, if the heat used be excessive (strong heat is not required in any part of the process), the mass becomes black, granular, and insoluble in water,—in fact, burnt and useless.—*Chem. News*, June 7, 1867.

A NEW PHOTOGRAPHIC VARNISH FOR PICTURES AND NEGATIVES.

By J. Grasshoff.

In order to give albumenized prints a more finished appearance they are sometimes coated with ordinary negative varnish. This treatment is open to several objections. The glossy surface

given to the picture by this varnish is by no means of a delicate character, and requires glazing before it is at all presentable; and the yellowish tint which it leaves on drying frequently gives photographs the appearance of having been insufficiently washed. For these reasons I have adopted the use of a spirit varnish, which I find remarkably suitable. Its cost is very moderate, it does not turn yellow, and it is easy of application,—the latter qualification being very desirable when large numbers of cartes de visite pictures are to be coated. The beauty of the picture is greatly enhanced by the use of this varnish, as it does not bestow too much lustre, and, being applied in very minute quantities, there is no fear of its becoming brittle and liable to peel off when dry.

The method of preparing is as follows:—Five parts of finely powdered gum sandrach are put into a vessel with twenty parts of absolute alcohol, and when the gum has been entirely dissolved by shaking, two parts of Venetian turpentine are added; the mixture is again agitated, and then one and a half parts of oil of lavender or oil of turpentine, and finally one and a half parts of camphor, powdered as fine as possible, are added, and the whole shaken up till completely dissolved, the entire operation being performed in about ten minutes. The varnish should be filtered or allowed to stand for a few days, and then poured off; if it does not give sufficient lustre, a further quantity (from half to one part) of gum sandrach is added.

The varnish is applied to pictures by means of a broad goat's-hair brush, an inch or inch and a half in breadth; it can be laid on very rapidly, and when coating small pictures it is a matter of no importance if the narrow margin of cards is covered with it. A few minutes is sufficient to dry the varnish, which then forms an admirable protection to the picture, especially in any of its defective parts, where it may have been improved and touched up with a brush. It sometimes happens, when the albumenized paper has received but an exceedingly slight coating of albumen, that small spots are formed on the application of the varnish, but these are not visible on a dark ground; should, however, such imperfections occur on vignetted pictures, the only

means of rectifying the same is to coat the picture with a sizing solution, glaze it, touch out the spots with a brush, and then re-varnish it. With albumenized paper of ordinary quality the formation of these spots very rarely takes place, the coating of albumen being sufficient to resist the penetration of the varnish.

For paintings, either in oil or water colors, this varnish will be found suitable, provided aniline colors have not been used. When these latter colors have been employed, it is better to use dammar or mastic varnish made by dissolving gum dammar or gum mastic in oil of turpentine, although, on account of its soft and sticky character and its liability to become yellow, I can scarcely recommend it.

My spirit varnish answers exceedingly well for coating negatives, and may be applied to them when quite cold. If it does not dry with sufficient rapidity, the negative may be warmed, but this is by no means necessary, and the varnish is to be diluted with alcohol if such a proceeding is adopted.—*Druggist's Circular*, July, 1867.

THE PREPARATIONS OF CONIUM OF THE BRITISH PHARMACOPŒIA, 1864 AND 1867.

By John Harley, M. D., Lond., F. L. S.

(Assistant Physician to King's College Hospital, and to the London Fever Hospital, etc.)

(*Continued from p.* 367.)

Extractum Conii.—Having completed my examination of the tinctures and succus, I come now to the consideration of the extract. Very few medicines have attained so great a reputation and have been so extensively employed as the extract of hemlock.

Introduced by Störck, in the year 1761, as a remedy of marvellous power in the removal of almost every inveterate disease to which the human frame is subject, it soon obtained admission into the Pharmacopœias; and, regarded as it is by practitioners of the present day as a powerful and useful remedy, it is still retained in almost every one of them. I myself have seen it prescribed almost daily, in doses varying from 1 to 5 grains, for the last twenty years. Nevertheless, it is to be observed that

the efficacy of the extract has been questioned, and several times disproved, from the days of Störck down to our own times.

The following is the formula for the extract, to the agency of which Störck attributed his wonderful cures :—

"℞ Herbæ recentis cicutæ, quantum sufficiat. Exprimatur succus, isque recens lentissimo igne in vase terreo (sæpius agitando, ne amburatur) coquatur ad spissi extracti consistentiam, hoc extractum s. q. pulveris foliorum cicutæ in massam pilularem subigatur; ex qua fiant pilulæ granorum duorum."*

In some cases a few grains, taken daily for two or three weeks, were sufficient to remove, as it appeared, an old-standing disease, while in others the patient swallowed ʒii of the extract daily for four or five months without inconvenience. "The extract of hemlock," says Störck, "is a remedy absolutely innocent; it does not hurt the sight, but the contrary."

The following criticism, by an eminent contemporary of Störck, appears to me very just, and worthy of mention in this place :—

"Quin et incomprehensibile, ac plane paradoxon videtur, id statuisse. Præterquam enim quod nec in meis, nec in *Breslaviensium* pluribus, ea vis cicutæ confirmata fuerit, si consulam auctorem, qua namque dosi, a cicutæ extracto, hanc vim edi putet, video a granis 2 de die observasse eandem et sic porro a granis 4, ab 8, a 12, a 20, 30, 60, 120, 180, 240, idque haud rariore admodum casu sed frequenti.

"Si granum opii consuevit homini blandum conciliare, erunt alii qui indigeant dupla dosi, rariores qui triplo, quadruploque, rarissimi qui quintuplo, qui sextuplo uno die indigeant. Cicutæ autem dosis cur adeo immense augenda fit, ex comparatione cum ceteris paregoricis haud facile capitur."†

Störck's observations on the use of hemlock excited so much attention that his experiments were repeated in almost every country of Europe, and many of the leading practitioners of those times gave his far-famed extract ample trials. It needed but a short time to convince all observers that Störck had greatly over-estimated its virtues. Not a few, however, were satisfied

* "Essay on the Medicinal Use of Hemlock," by A. Störck, 1761, p. 14.

† "Epistola de Cicuta." Antonius de Haen, 1766, pp. 20, 21.

that it was a remedy of considerable value. Störck, Collin (*a*), Quarin (*b*), F. Hoffmann (*c*), Hill (*d*), Rouppe (*e*), Gataker (*f*), Andrée (*g*), W. Butter (*h*), Akenside (*h*), Spalowski (*i*), Burrows (*j*), have all advocated its use, and given us the result of their observations; but if we carefully examine their writings, we shall fail to recognize any mention of the least trace of those effects which distinguish the action of hemlock. I believe, therefore, that we are fully justified in concluding that the extract, whether prepared in Vienna, Amsterdam, Geneva, Naples, or in London, was practically, if not absolutely destitute of the active principle of the plant. Indeed, the impotency of the drug was occasionally recognized by some of these observers themselves, who attributed it to various causes,—the wrong plant had been used; the locality in which it had been grown, or the situation in which it had been exposed, was unsuitable for the elaboration of its juices; the herb had been gathered a month too soon or too late; the whole of the watery juice of the expressed herb had been used, whereas the first portions should have been rejected and only the latter and more resinous part employed. Dr. Butter, with a more correct appreciation of the real cause, cautions against the employment of too much heat in the preparation of the extract, and gives the following directions for its preparation :—Evaporate the freshly expressed juice in a broad glazed platter over a charcoal fire, and, as soon as green clots form, stir the liquor frequently, keeping it at such a heat as will make them move about without driving them above the surface or occasion-

(*a*) Observ. circa Morbos Acutos, etc., 1765.

(*b*) "Tentamina de Cicuta," 1761.

(*c*) Observ. on the Internal and External Use of Hemlock, 1764.

(*d*) Sir J. Hill, "Directions for those Afflicted with Cancers, with account of the Vienna Hemlock," 1771.

(*e*) De Morbis Navigantium; acced. de effectu extracti Cicutæ, etc., 1764.

(*f*) "Essays on Medical Subjects," 1764.

(*g*) Obs. on Störck's Treatise, 1761.

(*h*) "Treatise on Kinkcough, with an Appendix on Hemlock," 1773.

(*i*) "De Cicuta," 1777.

(*j*) Prac. Essay on Cancers, with method of Administering Hemlock, 1767.

ing an ebullition. Evaporate with constant stirring till the extract is of sufficient consistence to form pills. Such directions, taken in conjunction with the precaution "*ne amburatur*," given in the previous formula, sufficiently indicate by what agency the powerful juice was reduced to an inert mass. As with the dried leaf, so with the extract, the active principle has departed and a dead inert body alone remains. The above mentioned authors introduce us to scores of patients who are taking the extract of hemlock largely. We look from one to another to discover some evidence—no matter how slight—of its action, but we search in vain; not a trace even of its earliest and most prominent effects are anywhere visible. We can hardly admit that these effects, evanescent though they be, could have been overlooked by such a body of intelligent observers. As scholars, at least, they were acquainted with the observations of Paulus Ægineta, Dioscorides, Plato, Galen, Plinius, respecting the action of hemlock; and, as scientific facts, these observations were repeatedly advanced in the discussions which the treatise of Störck excited in those days.*

Passing by these earlier observers, I find the effects of hemlock practically indicated, for the first time, in the works of Dr. Fothergill. Speaking of a particular patient, he says, "The dose of hemlock (extract) was gradually increased from 20 to 70 grains a day; if he took more, it either made him sickish or created a singular kind of headache and giddiness."† These are, I think, real indications of the presence of hemlock. It must be observed, however, that the extract used by Dr. Fothergill was much more carefully prepared than that used by Störck and his contemporaries,—precautions having been taken both to collect the plant at the proper time, when the active principle is most abundant, and to avoid prolonged exposure of the juice to a high temperature.

A medical friend of Bertrand administered ʒj of carefully

* Bertrand, "Recueil de Mémoires de Méd., de Chir., et de Pharm. Militaires," 1ère sér. vol. ix. p. 313.

† De Haen, op. cit. Viventius J., "De Cicuta," Naples, 1777, which contains a very complete reference to the observations of the Ancients on the action of Hemlock.

prepared extract, daily for a year, without result.* Dr. Allbutt, of Leeds, informs me that he "has often given the extract, in doses so large as to nauseate by its mere mass, without other results."

It thus appears conclusively that, from the time of its introduction to the present day, the extract has been regarded by many as an uncertain preparation, and it is remarkable that its value has not been long ago more satisfactorily determined. Christison, Geiber, Orfila, Pereira, and others, all concur in the opinion that most of the extract of conium of the shops is inert or nearly so. Pereira states that he was unable to procure any sensible quantity of conia from ℥iv of the extract.† The observations on the extract are concluded in his work by the following statement, which is accepted, I believe, as a pharmaceutical axiom:—"The goodness of the extract may be determined by the disengagement of a strong odor of conia, when it is gradually triturated with liquor potassæ." This test is so readily applied, and appears at the same time so decisive, that any more elaborate analysis seems superfluous, and yet I venture to assert that no statement can be further from the truth, no test more fallacious. Half an ounce of extract, containing but a fraction of a grain of conia, will, on trituration with caustic potash, speedily evolve a powerful and penetrating odor of conia, and the effect is usually very much heightened by the simultaneous separation of a little ammonia. A great d al too much has been inferred from this reaction, and it is to this cause, I believe, that we have so long remained in a state of uncertainty respecting the virtue of the extract. A given sample has been pronounced good, because, on commixture with caustic potash, it has evolved a strong odor of conia. Attention to the following experiments will show the fallacy of such a conclusion.

I have already proved that the "succus conii" prepared last season by Mr. Buckle, of Gray's Inn Road, possesses in a powerful degree the poisonous properties of hemlock. As many sources of error are by this means eliminated, I am fortunate in being

* Obs. on the Use of Hemlock, John Fothergill, M. D., Works, vol. ii. p. 59.

† Elem. Mat. Med, vol. ii. pt. ii. p. 206.

able to make two extracts, most carefully prepared from this succus, the basis of my investigations. One of these extracts was prepared strictly according to the directions given in the British Pharmacopœia, and contains, therefore, the albumen and chlorophyl of the juice,—this I shall call "ordinary extract." The other specimen was prepared by the same process, excepting that the coloring matter, separated by exposing the juice to a temperature of 130° F., was altogether rejected. This, therefore, I shall call "extract without chlorophyl." The evaporation of the juice in both cases was conducted at a temperature of about 160° F.

Ordinary Extract of Conium of the British Pharmacopœia.—The following were the characters of this extract:—smooth, dull olive-green, of a consistence sufficient for forming pills, taste acidulous, free from all bitterness and acridity, but partaking slightly of the nauseous oleo-resin of the plant. *Triturated with a little solution of caustic potash, a powerful odor, compounded of conia and ammonia, was evolved.*

1. January 22, 1867. Took 250 grains of this extract, and having liquefied it with a little water and f ʒiv of solution of caustic potash (1 part to 3 of water), thoroughly washed the mixture with separate portions of æther. After distillation of the æther, there remained 1·8 grain of a dark sap-green oily matter, which partly solidified after some hours. It possessed all the physical characters of the impure conia, obtained from the dried leaf by the agency of potash and alcohol (see examination of the dried leaf). Treated with dilute sulphuric acid, a portion dissolved, leaving a remainder of oleo-resin, colored with chlorophyl. The acid solution contained nearly 1 grain of hydrated conia.

2. April 7, 1867. I took 10 grains of this extract.

April 10: 15 grains.

April 13. I licked up 20 grains. Not the slightest effect followed any of these doses, although the conditions for their development were as favorable as could be desired.

I gave this extract in the same doses to two female patients; the one suffering from an ovarian tumor, the other from anæmic headache and dimness of sight. No effects followed its use, not

even in the latter patient, who was already predisposed for its action.

Extract without the chlorophyl.—This was of the consistence of treacle, and had a similar bright and clear, but a richer amber-brown, color; odor faintly approaching that of the ordinary extract, taste pleasantly sweet and acidulous, without any trace of acridity. *Triturated with caustic potash, a strong odor of conia, mixed with that of ammonia, is evolved.*

1. January 26, 1867. Took 250 grains, and having liquefied it with f ℥i solution of caustic potash (gr. 33 in f ℥i), transferred the mixture to a retort, and distilled from a chloride of calcium bath, at a temperature varying from 260° to 270° F. 8¾ fluid drachms of colorless fluid, with a faint greasy film, passed over. f ℥v water, containing 50 grains of caustic potash, were now added to the contents of the retort, and distillation continued as long as alkaline fluid passed. ℥viss of fluid in all, was obtained. The conia was obtained from this by neutralization with sulphuric acid, evaporation, separation of the sulphate of ammonia, decomposition of the sulphate of conia with H O, K O, and separation of the alkaloid by æther. It weighed only 0·2 of a grain.

2. By the process adopted in the separation of the conia from the ordinary extract (see above), I obtained from the same quantity (250 grs.) of this extract without chlorophyl exactly one grain of bright yellowish-brown oily fluid, which almost wholly dissolved in dilute sulphuric acid. It was, therefore, nearly pure conia.

3. February 13, 1867. I licked up 5 grains of this extract. March 10, 10 grains. April 2, 15 grains. April 3, 20 grains. No effects followed either dose; nor could I obtain the slightest physiological action in the persons of two delicate women by giving the extract in the above-mentioned doses. To produce the slightest evidence of the presence of hemlock, 50 grains at least would have been required, but the doses were not further increased; for to be of any practical value, the extract should contain such a proportion of conia that its effects may be manifested after a dose of 10 or, at most, 20 grains.

It would not be fair, perhaps, to conclude from the foregoing

experiments that all extract of conium is as deficient in medicinal power as the samples employed in these experiments have proved to be. Still, side by side with the facts referred to in this paper, they strongly persuade one to this view. The facts, indeed, of the particular cases before us are very strong. The juice employed in the preparation of the extracts has been proved, both physiologically and chemically, to be replete in active properties,—f ʒj of the "Succus Conii" = f ʒvj of the juice of the plant, and 30 grains of extract has been shown to contain 0·42 grains of conia; and every precaution was taken with the expressed juice to prevent decomposition by exposure to the air, to a high temperature, or to prolonged heat; and yet we find that 250 grains of it retain only a grain of the alkaloid. Again, two ounces of the dried leaf—equivalent to f ʒvj of the juice of the plant, and to very nearly 4 grains of conia—retain less than half a grain of the active principle. I say, then, that in face of these facts, there is a very strong body of evidence against the medicinal value of the extract.

With a view of determining what becomes of the conia during the process of evaporation, I have conducted the following experiments:—

1. Evaporated f ʒj of the Succus Conii, P. B., No. 1, over a water-bath to the ordinary consistence of the extract. About an hour was required for the operation. After liberating the conia, and completely removing it, I found that it weighed 0·30 of a grain, 0·12 less than I obtained by the same process from the same quantity of the succus, to which I had previously added f ʒss of dilute sulphuric acid, P. B., in order to fix the conia.

2. Placed f ʒj of the same sample of "Succus Conii" in a retort, and distilled f ʒiiiss by the aid of a water-bath. The distillation occupied three hours. The first f ʒiss passed over during the first fifteen minutes, and was collected separately. Excepting that the first fluid was chiefly spirit, the distillates did not appear to differ; both possessed a stronger odor of the plant than the succus itself; both gave out an extremely faint odor of conia on the addition of caustic potash, both were rendered faintly opalescent by the addition of nitrate of silver and of chloride of mercury. The remainder was transferred from the

retort to an evaporating dish, and exposed to the heat of a water bath for another hour. The syrupy residue was then mixed with potash, and thoroughly washed with æther. 0·19 gr. of conia was obtained, being 0·11 gr. less than was obtained by the first experiment, and less than half of the quantity contained in the ounce of "succus."

3. Exposed f ℥j of the "Succus" upon a plate in a glass-house with a south aspect, and where the natural temperature ranged from 70° to 90° F. After thirty-four hours the small syrupy residue was treated with potash and washed with æther; 0·25 of a grain of conia was obtained.

Two facts appear from these experiments—first, that the active principle of the plant is to a certain extent vaporizable even at a natural temperature of 70° to 90° F.; and secondly, that prolonged exposure to a high temperature is accompanied by a progressive diminution of the conia, the alkaloid being converted, as Dr. Christison has pointed out, into ammonia and some other secondary product.

Now the quantity of juice prescribed by the Pharmacopœia for conversion into extract, is about eight gallons, and the prolonged exposure to a temperature ranging from 140° to 212° F., required to effect this process, is doubtless sufficient to remove all but a trace of the active principle; and it is obvious from the foregoing that, given an efficient juice, the power of the extract will be inversely proportionate to the bulk of the juice operated upon; hence, to obtain an extract of full power, it will be necessary to expose the juice in a number of shallow dishes, and in a layer not exceeding half an inch in depth, to a rapid current of dry air having the temperature of 150° F., or thereabouts, so that the whole may be reduced to the consistence of an extract in the course of two or three hours. By this means an extract, containing 1 per cent. of conia at most, may be procured. And it is extremely doubtful whether a stronger extract can be prepared by this or any other process.

Such are the conclusions to which the foregoing experiments lead, and in respect of the use of the extract they are important. One fact is quite certain,—viz., that the power of the extract has been greatly over-estimated. The present Pharmacopœia (1867)

directs it to be given in doses of from 2 to 6 grains. Now, granting that this preparation retains the whole of the active principle, which, from my examination of the "Succus," I place at 1·4 grain in a 100 grains; 6 grains of the extract would represent only the 0·084 of a grain of conia,—a quantity insufficient to produce the effects of hemlock in a child two years old. The physiological action of hemlock is such, that doses which fall far short of producing it are of no use; and it is doubtful whether the possession of an extract containing 1 per cent. of conia—which I believe is the strongest that can be made—will be of any advantage, since 25 grains of it would be equivalent to only f ʒiv of the "*Succus*" of the Pharmacopœia.

It has been doubted by some whether the Athenian state poison was wholly derived from the hemlock; I see no reason myself—on account of the expression "*μικρὸν πάνυ καταπότιον*, a very little dose"*—for doing so. The inspissation of the juice was effected, according to Dioscorides, by exposing it to the sun; and by this means a syrup may be prepared, of which, assuming the Greek plant to be equally powerful with that grown in these temperate regions, a table-spoonful or two would doubtless prove a fatal dose.

I will conclude these remarks by the following particulars, which will serve to render my account of the Succus Conii, No. 1, upon which I have chiefly based my experiments, more complete. f ʒj of the "*Succus*" yields six grains of white ash, which fuses with effervescence before the blow-pipe into a porcellaneous mass, dissolves with copious effervescence in the mineral acids, and the clear acid solution gives an abundant heavy yellow crystalline precipitate with bichloride of platinum. Hence it follows that the juice contains one or more vegetable acids and potash.

It is to be observed that Schrader† makes no mention of either soda or sugar in his analysis of the juice, and that he, De Machy and Errhardt‡ mention nitric acid as one of its constituents. I

* Theofrastos, Hist. Plant. iv. viii. p. 298, ed. Schneider.

† Berzelius, "Traité de Chimie," vol. vi. p. 254. Berlin Jahrbuch, 1805, s. 152.

‡ Bertrand, op. cit. p. 306.

have carefully examined the ash left by the combustion of the extract, and find myself in agreement with Bertrand and Baumé in being unable to discover a trace of nitrates.

Vapor Coniæ.—The use of the extract in the formation of the vapor is objectionable, for two reasons: first, the quantity of conia contained in the portion of mixture prescribed, is too small to relieve spasm; and, secondly, any influence which a minute portion of the alkaloid might possess, would probably be more than neutralized by the simultaneous evolution of ammonia from the alkalized extract.

In the following form these objections do not exist, and the dose of conia can be readily graduated:—

Conia, 1 grain.

Alcohol, $1\frac{1}{2}$ fluid drachm. Dissolve the conia in ʒss of the alcohol, and add the remainder mixed with the water.

Water, $2\frac{1}{2}$ fluid drachms.

20 minims contain $\frac{1}{12}$ of a grain of conia.

78, *Upper Berkeley St., W., April* 21, 1867.

—*London Pharm. Journ.*, June, 1867.

MANUFACTURE OF STARCH, UTILIZATION OF THE WASTE.

More than 100 tons of wheat are annually employed in the fabrication of starch in France. M. L. Maiche, of Paris, now proposes to utilize the waste as an aliment.

The best wheat only contains 55 per cent. of starch, while rice of the most ordinary description contains 85 per cent.; maize and buck-wheat also contain a considerable proportion. The difficulty consists in the separation of foreign matters, such as bran, cellulose, gluten, &c., contained in the pulp of the grains. Having isolated small quantities of cellular tissue and other substances, the author found that the specific gravity of these bodies was much less than that of starch.

If raw starch is placed in water, a small quantity of almost pure starch is deposited, but the bulk only falls mixed with the different substances above mentioned; these, although specifically lighter, are relatively more heavy, being much larger than the

starch grains. M. Maiche takes advantage of difference of specific gravity, in order to obtain a complete separation; he makes use of centrifugal force, by which the specifically heavier bodies are thrown farthest off. The mode of operation is the following:—A mixture of raw starch and two parts of water is introduced into a sort of drum of copper, turning on its axis at the rate of 1,000 to 1,200 revolutions per minute; as soon as the velocity attains 450 turns, the starch commences to be separated, and collects in a compact mass, adhering to the sides of the vessel; all the impurities remain in the water, in the centre, which is easily drawn off, while the perfectly white and pure starch can be removed in lumps. All amylaceous matters can be treated by this method, and the extraction of the starch, which formerly required several weeks, now takes place in a few minutes. The return is much greater, for 100 kilogs. of rice, costing less than 100 kilogs. of wheat, give more than 20 francs worth of starch. There is then no reason for employing, in the manufacture of starch, wheat which gives the best and most nutritious flour, and the chief principle of nutrition of which, the gluten, is almost entirely lost by the process actually employed.

F. Moigno.

London Chem. News, July 19, 1867.

PHENIC ACID, ITS MANUFACTURE AND PROPERTIES.

We give an extract from the excellent lecture given at the Society for the Encouragement of National Industry, on *Phenic Acid and its Compounds*, by Dr. Crace-Calvert. It is well known that when coal is heated to a low degree in retorts or distillatory apparatus it gives off substances that can be classed into four groups.

1. Gaseous products furnishing light, heat, and motive power.
2. Water containing ammoniacal salts, which can be purified by well-known chemical means, and utilized in agriculture and in the industrial and medical arts.
3. A thick, black, sticky mass of a repulsive odor, to which the name of *tar* has been given, and which passes over along with the above-named products.

4. A solid porous body, known by everybody as "coke," which remains in the retorts.

When tar is submitted to distillation, first water is obtained, then products which pass over with this liquid, but which, lighter than it, floats on the surface, and are therefore termed the *light coal oils*. Lastly, there is distilled a compound heavier than water, and consequently called *heavy oil*.

It was about the year 1837 that these heavy oils were first used for the preservation of sleepers according to Bethell's process. M. Farestier, engineer-in-chief of the department of the Vendée, conjointly with M. Marin, engineer, published a very remarkable and very complete work on the creosoting of wood and its preservation for twelve, fifteen, or twenty years from decay and the ravages of water and the teredo. There remains in the retort a substance fusible at the high temperature attained after the oils have passed over. This is asphalte or bitumen, which hardens on cooling. The distinguished lecturer then proceeded to "phenic acid," stating that M. Laurent, the great French chemist, was the first to indicate the method of extracting phenic acid from tar. It consisted in submitting the light coal oils to a partial distillation, and treating by a concentrated solution of potash, the products distilling at a temperature between 160° and 200°

In 1847 Mr. Mansfield indicated another method of treating the heavy oils by caustic alkalies, and towards 1856 M. Bobœuf made known his modified process of M. Laurent. This consists chiefly in the use of caustic soda instead of potash, and treating the whole of the light oils, instead of a portion, by Laurent's method; but this only gave an impure acid, yet, in a commercial point of view, it was a progress. Of a similar nature were the products manufactured by Mr. John Bethell, since 1847, under the direction of Mr. Calvert. They were used for several purposes, either for the production of picric acid, or for transforming tannic acid into gallic acid, or for preserving organic substances from putrefaction. M. Bobœuf used it also very extensively for this purpose.

In 1859, M. Marmas, of the firm of Guinon, Marmas, and Bonnet, of Lyons, came to Manchester, and requested Mr. Cal-

vert to furnish a purer picric acid than that hitherto made, showing him, at the same time, a product white and crystalline, which they furnished as a type. Mr. Calvert made new researches and discovered that the most favorable mode of preparation was not to treat the coal oils with concentrated alkalies; but, on the contrary, to treat impure benzine of commerce, or naphtha, by weak alkaline solutions.

By this means, a blackish semi-fluid product was obtained, a little heavier than water, having a sp. gr. of 1·06, containing 50 per cent. of real phenic acid, and which acid he separated partly by the aid of distillation. After further researches, Mr. Calvert produced white phenic acid in detached crystals, melting between 26° and 27°C. Towards the end of last year he discovered a process by which he produces phenic acid free from all unpleasant taste; and what deserves remark is, that it is as pure, though it is made from coal tar, as if it had been artificially produced by the aid of reactions recently discovered by MM. Wurtz and Kékulé.

F. Moigno.

London Chem. News, July 19, 1867.

ARTIFICIAL MILK.

At the last meeting of the Academy of Medicine, M. Giboust, Professor at the School of Pharmacy, read a paper which we cannot help noticing. He called the attention of the medical world to the description given of the artificial milk invented by Baron Von Liebig, and regretted very much being obliged to enter into a controversy with him. After having reminded the assembly of the composition of this milk, and insisting upon the difficulties attending the preparation of such aliments in places where it might be most necessary, such as with wet-nurses or small families, M. Giboust added that we have at our disposal a natural product which more nearly resembles human milk than does a mixture of cow's milk, flour, malt, lactate and butyrate of potash. It is cow's milk itself. On an average, human milk contains a little more water, more sugar of milk, less butter and caseine than cow's milk. Thus, by taking the latter, and adding a little sugar and a fifth of its weight of water, we have an ali-

ment, at the disposal of everybody, forming a better substitute for human milk than any artificial compound.

M. Depaul, on his part, declared that he undertook experiments on new-born children, to examine the effects of this artificial milk, the taste of which was, by the bye, less agreeable than that of natural milk. Four children were tried. The two first were twins, and born prematurely. In spite of the care bestowed upon them, and the nourishment by the artificial milk, they died in two days. The third, born at full time, weighed 3 kilogs. 370 grammes; the mother was ill. The nourishment given was that of artificial milk. At the end of two days, the dejections became green, and on this day the child perished. The fourth infant, born under the same conditions, and nourished with the same aliment, died after four days. M. Wurtz promised to write to Baron Von Liebig, to obtain more precise details on the preparation of this milk.—*The London Chem. News, July* 15, 1867.

THE DIET OF PAUPERS.

In the diet of paupers, it is necessary that a due regard be had to economy at the same time that the food is adapted to the proper nourishing of the body. There should be as little waste material as possible. Dr. Edward Smith, of London, who has given the subject much attention, has of late been examining the relatively-nutritive value of the different cereals, as well as their commercial value. On a review of the subject, he says:—

"I arrive at the conclusion that wheaten-*seconds* flour should be universally adopted for the food of paupers, whether in or out of doors." He found that the second flour is richer in nitrogen than the farina, which is the only part of the wheaten meal left after its several screenings, and it has, therefore, in one respect, an advantage in nutrition. Dr. Smith condemns the coarser kinds of bread, especially "brown," not only on account of their being more indigestible, but also of their actually injurious operation, by giving rise to diarrhœa, from the mechanical action of the indigestible matter contained in the flour. On this point there will be, however, a considerable differ-

ence of opinion. Taking the two important elements of nourishing diet, carbon and nitrogen, Dr. Smith alludes to the fact that the daily requirments of an able-bodied adult, of the average weight of 150 pounds, are about 9½ ounces of carbon and 3⅓ drachms of nitrogen, when employed in-doors. Acting upon this estimate, he has proposed a diet for this class as follows:—9 pounds of bread per week, 16½ pints of gruel, which contain a pound and a half of oatmeal, besides a due proportion of suet and molasses; once a week he is allowed a pound of meat pie, and twice a week 10 ounces of suet pudding, besides 9 pints of broth and soup, and half a pound of cheese; so that this class is daily allowed nearly two pounds of highly nutritious food, equal to a little more than 9 ounces of carbon and 3½ drachms of nitrogen daily, which corresponds as nearly as possible with the amount demanded and supplied by the laborer, when he is free to make his own selection.—*Med. and Surg. Rep.*, July 20, 1867.

Varieties.

Women as Apothecaries.—A decided advance in the matter of Woman's Rights has been made in Holland. The Minister of the Interior has issued a decree admitting women to examination for the position of assistant apothecaries—an operation hitherto restricted exclusively to men. This measure will enable country doctors to have their prescriptions made up by their wives or daughters, and will thus relieve them from the charges of a male assistant.—*New York Med. Jour.*, August, 1867.

Mr. Hoff and the N. Y. Academy of Medicine.—At the last meeting of the Academy of Medicine, the following resolutions were unanimously adopted:

Whereas, W. L. Hoff, proprietor or agent of the "Hoff Malt Extract," is issuing publications through the secular papers, and by means of pamphlets and circulars professing to quote favorable opinions expressed in a report of a committee of the Academy;

And, *Whereas*, the said Hoff is widely circulating a letter purporting to have been written by a Fellow of this Academy;

And, *Whereas*, the publications of said Hoff are so adroitly and designedly worded as to impress the mind of the reader with the belief that the

Academy has endorsed his nostrum, and has thus apparently compromised its dignity and professional standing—Therefore,

Resolved, That the N. Y. Academy of Medicine does hereby proclaim and declare that it has not expressed any opinion in regard to "Hoff's Malt Extract," and that any and every use of its name in recommending said Extract is unauthorized by the Academy.

Resolved, That a copy of the above preamble and resolutions be sent to the Medical journals of this city, and that the Medical journals throughout the country be requested to publish the same, in justice to the Academy and the profession.—*Ibid.*

Quack in Chicago.—A villain of a quack in Chicago is pretending to cure diseases not simply by laying on of hands, but by *supplying invalids with garments and paper imbued with healing virtues by contact with his body!* And the fellow has patients of course—and possibly certificates from clergymen to back him up in his imposition.—*Med. and Surg. Reporter*, Aug. 3, 1867.

Medical Matters.—A correspondent of the *Union Médicale*, writing about medical matters at the great "Exposition," says the best arranged vehicles for the transportation of the wounded in battle are those of the United States and of France. "The transportation of those who have been operated on, from ambulance to hospital, on the part of each nation, is formally installed [as we should say, 'has become an institution'] only in the United States. It must be confessed, these bellicose Americans have had opportunity and time to experiment with their *materiel*. Ah, incredible people! so intelligent and so warlike."

The writer then gives an elaborate description of our "hospital car," and adds, "all nations should take pattern from the United States in the arrangement of drugs, medicine flasks and boxes, for transportation. Everything fragile is protected. No shocks, overturnings, or other accidents can break the bottles or force out their stoppers."

The letter is closed with an admiring notice of our military hospitals.—*Boston Med. and Surg. Journal*, June 27, 1867.

Petroleum,* says the *Union Médicale*, is a powerful agent for the destruction of insects. The crude oil is the best for the purpose. A few *grammes* of petroleum diluted with water, and sprinkled by means of a watering pot over strawberry plants, destroys the *maus*, or "white worm of the beetle," which infests those plants. The crude oil mingled with a large proportion of water is a sure poison for crickets. The mixture is to be poured through a tunnel into the holes frequented by them.

The *acarus scabiei* is very promptly and radically destroyed by inunctions with the oil.

* Not oil of petroleum, as many journals have it.

Frictions with petroleum water (60 gr. per litre) immediately cleanse the domestic animals of the parasitic insects which annoy them. The animals should be washed with soap-suds a few minutes after the friction.

It is also stated that a house infested with rats and mice was freed from these guests a little while after the introduction of a large quantity of the oil into the cellar.—*Ibid.*

New form of Antiseptic for local use.—The liquor carbonis detergens is recommended. It is an alcoholic solution of coal-tar, containing, we presume, the carbolic, phenic, and other acids, with dark tarry matter, and differing from carbolic acid, as the liquor cinchonæ does from quinine. It readily mixes with water, forming a permanent emulsion, and in various strengths is available as a mouth-wash, a gargle, an injection for fetid uterine discharges, cancer, retained placenta, etc., gonorrhœa in the female, foul ulcers, sloughing sores, and all maladies dependent in, or complicated by, parasite beings, lice, fungi, etc. It is also used combined with soda.—*Buffalo Med. and Surg. Journal*, June, 1867, from *Med. Times and Gazette.*

Coating of Pills.—There is much ingenuity wasted in the coating of pills. Our apothecaries have "swung round the circle," and revived an old and exploded practice of coating them with silver or tin. This is an abominable plan. Both chemistry and therapeutics are at war with it. Collodion protects the pill from solution in the stomach. Sugar and gum are the only legitimate materials. At best, however, there is but little use in coating pills. Any properly educated person can swallow an uncoated pill without tasting it. It comes natural to boys to swallow cherry stones, and everybody can take down grape seeds by the pound. Only by some trick or perversion of the apparatus of deglutition can difficulty arise, and this may be corrected by discipline. It is extremely unfortunate for a chronic patient to be unable to swallow pills. Some medicines can scarcely be administered in any other form, and many a dose, otherwise nauseous, may be smuggled into the stomach in this form, without awaking from slumber the gustatory sentinels. Parents should always see to it that their children do not grow up with the distressing trick of shutting down the gullet against a friendly pill.—*Pacific Medical and Surgical Journal*, June, 1867.

War and Insanity.—In the last Annual Report of the Taunton (Mass.) Lunatic Hospital, referred to in the Boston *Med. and Surg. Journal* for March, the Superintendent, Dr. Choate, says: "At the commencement of the great rebellion, contrary to common expectation, there was an immediate and general check to the numbers thronging to all public institutions, and to insane hospitals among the rest. This continued throughout the war, but with its cessation there has been an immediate though gradual

increase." "A few, but not many patients, have been admitted in whom the mental disease might fairly be attributed to their connection with the great contest." "On the whole, it seems probable that the general effect of the national trial has been healthful to the public mind, and that, although some new causes of mental disease have been introduced, yet the per centage of insanity has been slightly reduced." Are the causes of insanity becoming more numerous? or is insanity made more prominent and public by the modern system for the care of the insane?—are questions which the doctor deems probable should both be answered in the affirmative.—*Ibid.*

Saururus cernuus. By D. L. PHARES, A.M., M.D., of Newtonia, Mi.—The whole plant is medicinal, and has a rather offensive, heavy, slightly aromatic odor and taste. It is lenitive, anti-spasmodic, sedative, slightly astringent. It has been much used in some parts of the country in regular as well as domestic practice, as a soothing, discutient cataplasm. It has been highly and specially recommended as a remedy to allay pain, and prevent suppuration in mammary inflammation. In these affections I have never employed it; yet I doubt not its value as a cataplasm.

But for ten or twelve years I have employed it very extensively, and with most satisfactory results, in the treatment of irritations and inflammations of the kidneys, bladder, prostrate gland, urethra and epididymis. It is specially indicated in all cases attended with strangury, or ardorurinæ; and when freely exhibited in warm infusion, very promptly removes the unpleasant symptoms. It is a valuable palliative in gonorrhœa and chordee; and a good vehicle for, and adjuvant to other remedies addressed to the genital urinary organs. It is not offensive to the stomach, and consequently is rarely rejected, even when that organ is in an irritable condition; it tends rather to allay the irritation.

I would venture the suggestion that this plant might be advantageously employed in treating some affections of the vagina, uterus and ovaries, both constitutionally, and in the former two locally. I think it might be used also beneficially in certain conditions of the nasal passages, fauces, trachea, bronchia, &c.

In some parts of the country where I have introduced its use, it has become so popular that whole plantations of it have been exhausted. A strong, hot infusion of the plant, crushed, whether dry or recent, is made. Of this, the patient may take from one to four ounces every quarter or half hour, or only three or four times a day, according to the urgency of the symptoms or particular object had in view in its exhibition. It may often be substituted for buchu or uva ursi leaves, and in many cases is much superior to either.—*Atlanta Med. and Surg. Jour.*, July, 1867.

Prof. Pancoast's Recipe for Beef Tea.—Take a pound of beef, carefully freed from fat, from the loin or neck, and cut it into small pieces, as large

as the end of the thumb. Then add five grains of unbroken black pepper and a little salt, care being taken not to spoil it by making it too salty, as is often done. Pour on a pint of cold water, and simmer on the fire for forty minutes. Take out the meat, squeeze all the juice from it through a linen bag into the tea, which then boil for ten minutes.—*Med. and Surg. Reporter*, July 20, 1867.

Sugar in Muscle.—Dr. Ranke, of Munich, has by recent experiments confirmed the discovery made by Meissner, that a true, fermentable sugar exists in the muscle, which is increased by muscular action (tetanisation caused by strychnine or electricity), and further that the liver has no effect in causing this increase, for the sugar is proved to arise in the muscle itself, and not from muscular substance.—*Ibid.*

Pepsin.—The physician before using pepsin in his practice, should assure himself of its purity by testing, as there are many spurious articles found in commerce. It should be completely soluble in water.

The indications for its use are: first, deficient secretion of the gastric juice: second, imperfect peristaltic movement of the stomach and intestines: third, too short a stay of the food in the stomach. One or two grains of pepsin are sufficient for a dose. Dr. Hollman has found it very efficient in anæmia, chlorosis, atrophy and debility from loss of blood or from severe sickness; it may be given alone, or combined with opium or tonics or other remedies; if given alone it is mixed with a little sugar or milk.—*Druggists' Circular.*

NOTICE.

American Pharmaceutical Association.

Notice is hereby given, that the Fifteenth Annual Meeting of the American Pharmaceutical Association will be held in New York city, commencing at 3 o'clock, P. M., on the second Tuesday in September (10th), 1867.

A suitable room has been secured by the local secretary, in the University Buildings, on University Place, corner of Waverly Place.

Aside from the importance of the reports to be submitted, it may be of interest to the Association to know that several of our members, now abroad, will act as delegates of the Association to the International Congress of Pharmaceutists at Paris, August 21, and will return in time to be present at the session in New York.

A cordial invitation is extended to all engaged in trade or manufactures connected with pharmacy, to send specimens of their stock or products for exhibition during the session.

These may be sent to P. W. Bedford, Secretary of the American Pharmaceutical Association, University Buildings, New York city, notifications to that effect being addressed to him in advance, by mail, to 769 Sixth Avenue.

FREDERICK STEARNS,
President of the American Pharmaceutical Association.

Detroit, May 15, 1867.

AMERICAN PHARMACEUTICAL ASSOCIATION.

NEW YORK, July 12, 1867.

Sir:—The Annual Meeting of this Association will be held in this city, September 10th, 1867.

It is proposed to have an *Exhibition of Objects relating to Pharmacy*, or having a special interest for members of the Association. It is very probable that the meeting will be more largely attended than any preceding.

The following classes of articles are particularly desired:

1. Chemical apparatus, including those for pharmaceutical processes. This includes apparatus and utensils for evaporation, distillation, percolation, &c., and analytical apparatus of all kinds.
2. Microscopes, microscopical apparatus and objects.
3. Apparatus used for remedial purposes, as galvanic and electro-magnetic machines, enemas, surgical appliances, &c.
4. Glassware, adapted for the wants of the apothecary.
5. Scales and weights, for chemical and store purposes.
6. India Rubber goods, for pharmaceutical, chemical, or remedial purposes.
7. Improved dispensing appliances, as bottles, boxes for pills and powders, labels; protection against mistakes by pharmaceutist or patient, etc.
8. Medicines newly introduced or proposed for use.
9. Mineral Waters and apparatus, including natural and artificial medicinal waters, and apparatus for making and dispensing them.
10. Specimens of chemicals, drugs, pharmaceutical preparations, as also botanical specimens.
11. Illustrations of adulterations, and the means of detecting them.
12. Improved dietetic preparations.
13. Books relating to pharmacy or collateral sciences.
14. Historical relics having an interest in connection with pharmacy, or its cultivators, as portraits, photographs, autographs, &c.
15. Any improvements in branches connected with pharmacy, not included in above.

The Exhibition will be open from Tuesday, September 10th, to Saturday, September 14th, inclusive.

The following regulations are to be observed:

1. Articles for exhibition are to be delivered, free of expense, at the University Building (University Place, corner Waverly Place), on or before September 6th; an invoice of the goods being previously sent to the Local Secretary.

2. Descriptive accounts should accompany all apparatus, &c., that are new or not fully understood.

3. The Local Secretary will take charge of unpacking and repacking articles sent for exhibition.

4. Articles intended for sale must have full particulars, addressed to the Local Secretary.

Should you be willing to exhibit any articles, please address the undersigned, *without delay*, stating what kind of articles you propose to send, the space required, and whether on floor, table, or wall, or if a glass case is necessary.

Yours Respectfully,

P. W. BEDFORD, Local Secretary,
769 Sixth Avenue, New York.

ABSTRACT FROM THE MINUTES OF THE MASSACHUSETTS COLLEGE OF PHARMACY.—The regular meeting of the Trustees was held Aug. 7th, Mr. S. M. Colcord presiding.

Mr. G. F. H. Markoe, in behalf of Messrs. L. Martin & Co., operative chemists, of Philadelphia, presented to the College a cabinet of fine chemicals, and gave some results obtained by testing the most important articles, all of which were found of excellent quality. The following resolutions were offered, and unanimously adopted:

Resolved, That the Massachusetts College of Pharmacy gratefully appreciate the interest manifested in the College by Messrs. L. Martin & Co., as exhibited by their generous donation.

Resolved, That we cheerfully recommend to New England pharmaceutists the chemicals made by Messrs. L. Martin & Co., as being of excellent quality, and well worthy to replace the commercial articles, which are too often impure, and unfit for pharmaceutical uses.

Resolved, That the Corresponding Secretary be instructed to forward a copy of these resolutions, with the hearty thanks of the College for the collection of chemicals added to its cabinet.

The following gentlemen were chosen delegates to attend the meeting of the American Pharmaceutical Association, to be held in New York in September:—

Chas. A. Tufts, Geo. F. H. Markoe, Geo. P. Ricker, S. M. Colcord, A. P. Melzar.

GEO. F. H. MARKOE,
Cor. Sec. Mass. Coll. Ph.

Editorial Department.

FIFTEENTH ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—Before this number will reach some of our subscribers, this meeting will take place in the city of New York, where the Local Secretary, in conjunction with a committee from the New York College of Pharmacy, has made preparations for the reception of the Association. When the meeting was last held in New York, in 1860, it was probably the largest gathering of pharmacists in the United States up to that time, and now, after a lapse of seven years, we may confidently expect that the coming meeting will be of still greater importance, and, as far as numbers are concerned, assume still greater proportions. We have received letters from nearly every section of the United States, the writers expressing the hope of greeting old friends again on the 10th of September next, and of deliberating with them about the welfare of the Association, and of the profession of pharmacy in this country. The delegates to the International Pharmaceutical Congress, which was held at Paris during the latter part of August, may probably return in time and report to the meeting. The following members had been duly accredited to that duty:—Professor Wm. Procter, Jr., of Philadelphia; John Faber, of New York; Thos. E. Jenkins, M.D., of Louisville, Ky.

We have been informed that the Union Place Hotel, corner of Broadway and Fourteenth Street, has been selected as the headquarters of the members during the meeting, which will convene at the University Buildings on Tuesday, Sept. 10th, at 3 o'clock, P. M.

PRESCRIPTIONS—WHOSE PROPERTY ARE THEY?—If our memory serves us correctly, this or a similar query was discussed, some years ago, in the English journals, but we do not remember the conclusion arrived at. In central, northern, and eastern Europe, the prescriptions which have been compounded are handed back to the patient for whom they were prescribed; the pharmaceutist retains them only in case they are not paid for, and the very fact of the prescription being in his possession, is evidence of his claim for the amount which he is legally authorized to charge for the same. In this country the custom prevails of the prescriptions being retained by the apothecary. Neither in Europe nor in the great majority of cases in this country has the right of the patient been questioned to have a prescription renewed as often as he pleased. For a number of years past, however, we have known several physicians in this city who had a sort of a contract printed upon the papers used by them for writing their prescriptions upon, in which it was stipulated that "this prescription is to be retained by the pharmaceutist, who will neither furnish a copy nor renew it without the written order of the prescriber." To the best of our

knowledge these stipulations have been faithfully adhered to by the dispensers, who regarded this as a contract entered into by the patient and attending physician, and whereby they were constituted as the custodian of certain properties of the latter. If the physician wishes to guard against improper uses being made of his prescriptions, this course appears to be a very simple one, which guards his supposed right in the prescription for this particular case, and at once relieves the pharmaceutist from all demands arising from the supposed right of the patient for this same prescription, which was written for him.

The East River Medical Association have taken this matter into consideration, and at their stated meeting, held July 2d, adopted the following:—

Whereas, The attention of this Society has been called to consider the propriety of taking action relative to the practice of druggists renewing the prescriptions of physicians without their written order, thereby injuring very materially the pecuniary interests of the profession, without gaining any particular benefit to themselves; and

Whereas, In view of the graver and more important consideration that the interests and lives of patients are, in consequence, endangered, we consider it a duty to guard to the utmost of our ability against the liability to mistakes which should be prevented rather than deplored; be it therefore

Resolved, That we cordially invite the earnest co-operation of every druggist in this city, especially in our immediate districts, to further this laudable purpose; and be it further

Resolved, That we respectfully request that no druggist will renew the prescriptions of any physician connected with this Society, without due authority for each and every such renewal. Further, we will regard as unworthy of our patronage any druggist who fails to comply with the requirements of these resolutions.

Resolved, That a copy of these resolutions, with a blank card, be sent to each and every druggist in our districts, with a request that the card be returned within two weeks to the Secretary, signifying their intentions, with reference to compliance, or non-compliance, with these resolutions.

We do not object to the obligations put upon the pharmaceutist (not druggist) by these resolutions; we are firmly convinced that all true followers of pharmacy will, as far as in their power lies, assist in carrying out such an agreement entered into between patient and physician. Thus far, however, we can see no "impropriety" in repeating prescriptions without a written order,—a practice which has been established by long usage, which has been countenanced by the continued *verbal* orders of most physicians, and which can be abrogated only by a course similar to the one pointed out above. M.

How to become an M. D.—Some weeks ago, we had the pleasure of receiving a little sheet headed, *Mariott's Philadelphia Collegiate Agency*. It is issued by G. W. Marriott, D.D., M.A., M.D., and is made up of notices of the medical and dental colleges and some journals, established in this city. The number before us knows nothing of the Philadelphia

College of Pharmacy, nor of the *American Journal of Pharmacy*, both of which have existed for a longer period than the average duration of the human life. While inquiring of us about the College, the gentleman who handed us the above mentioned sheet learned that we were not so fortunate—as the *Medical Record* of New York has it—of being legally entitled to the appellation of Doctor of Medicine; to remedy this defect, he proposed to procure for us the legal right of attaching M.D. to our name, by granting—to be sure, after an examination—a diploma from a regularly chartered Medical College. We were rather too hasty in declining the proffered honor, to receive which we frankly acknowledged our unworthiness; we might perhaps have learned which regularly constituted College is disposed to grant diplomas in such an extremely regular way. On this point we were left completely in the dark, and had to content ourselves with the assurance that the gentleman was duly authorized—besides granting for the consideration of $75, and after due examination, the title of M.D.—likewise the degrees of Doctor of Divinity, Doctor of Laws, and Master of Arts. Unfortunately, we belong to that variety of the genus homo who have no particular use for any one of these titles, being content to be simply an apothecary, or, to use a nicer expression, a pharmacist. Considering it, however, as a prime duty to be charitable to our fellowmen, we would herewith inform our medical friends that they might have procured the "handles" to their names with less trouble, and all seekers after such distinction, how they may be accommodated on the most reasonable terms. And thus we leave this plenipotentiary for conferring all sorts of scientific honors to the tender consideration of all whom it may concern.

J. M. MAISCH.

CONSANGUINEOUS MARRIAGES.—We have received the following circular, which we publish for the information of our readers. The importance of the subject renders the co-operation of all desirable who possess information relating to this subject:

118 *West Houston Street, New York, July*, 1867.

SIR:—At the late meeting of the "Medical Society of the State of New York," it was resolved: "That a Committee be appointed to investigate and report upon the result of consanguineous marriages, &c."

If such marriages come under your observation, you will confer a favor by answering the following questions, and transmitting such report, before November next, to the undersigned, one of the Committee appointed:

1. Name (initials) and age of *husband*.
2. Nativity.
3. Age when married.
4. Constitution.
5. Health, deformities, peculiar diathesis.
6. Health of his family, hereditary diseases, deformities, &c.

7. Name (initials) and age of *wife*.
8. Nativity.

9. Age when married.
10. Constitution.
11. Health, deformities, peculiar diathesis.
12. Health of her family, hereditary diseases, deformities, &c.

13. How are the parties related to each other?
14. How long married?
15. How many children, or sterility?
16. Abortions; cause; how many, and at what period?
17. Children died, at what ages and from what diseases?
18. The constitution, age and present health of living children, deformities, mental conditions, idiocy, cretinism, deaf, mute, blind, epilepsy, albinism, insane, &c.
19. Remarks and other information.

Hoping to receive your valuable co-operation, for the advancement of medical science, I remain yours, most respectfully,

ROBERT NEWMAN, M.D.

IODIDES OF CALOMEL.—Our attention has been called to the following note which appeared in a late issue of the *Chemical News:*

"JAMES Y.—The term iodide of calomel is retained in American pharmacy for a mixture of iodide and chloride of mercury, prepared by mixing iodine with calomel. According to the same barbarous nomenclature, there is a biniodide of calomel."

The mixtures in question were proposed by Boutigny, and a process for their preparation, by Gobley, was published in this journal in 1858; from there they found their way into Parrish's Pharmacy, 3d edition, page 484. To the best of our knowledge, they have never been used in this country, and the barbarous names were given them merely because they were christened thus by their French parents. We can assure our correspondent that we have always looked upon them—the preparations as well as the names—as a curiosity and as an indication of what men may come to in their continual endeavor of producing some "new preparation."

M.

LECTURES ON THE TREATMENT OF THE SURGICAL DISEASES OF WOMEN.—By reference to the advertising sheet, our readers will learn that Dr. Storer will deliver a private course of lectures on the above subject in December next. His lectures have been highly commended by his former attendants, and no doubt the Doctor will again have a good class of medical gentlemen to hear him on a topic to which, we understand, he has paid special attention for a considerable period. M.

THE APPROACHING LECTURE SEASON.—We have received circulars from the different Colleges of Pharmacy announcing the regular courses of lectures commencing in October next. We are pleased to learn that the prospects of all are favorable for larger classes than usual. We also notice with pleasure the contemplated introduction of botanical courses during the summer season.

If we understand the tenor of the circular correctly, *apothecaries only* can graduate at the Maryland College of Pharmacy, which grants to wholesale druggists a *certificate of proficiency* (not a diploma) under similar restrictions under which apothecaries may receive the degree of *graduate in Pharmacy*. This is, we believe, the first of our Colleges drawing the distinction between *Apothecaries* and *Druggists*.

We sincerely wish that all the Colleges may meet with the success which they hope for, as by sound education only the cause of pharmacy is furthered and the profession raised to that position which it deserves.

We refer to our advertising sheet, where full information may be obtained.

The Atlantic telegraph has informed us of the death of Professor Faraday, which occurred on the 27th of August. We hope to be able in a future number to give a sketch of the life of this eminent man.

Micro-Chemistry of Poisons, including their physiological and legal relations: adapted to the use of the Medical Jurist, Physician, and General Chemist. By Th. G. Wormley, M.D., Professor of Chemistry and Toxicology in Starling Medical College, and of Natural Sciences in Capital University, Columbus, Ohio. With 78 illustrations upon steel. New York: Balliere Brothers. 1867.

This excellent work is a very valuable addition to the literature on the subject of poisons. Each page bears evidence of untiring research and of a vast amount of labor. The increase of our knowledge, at least as far as the limits of observable chemical reactions of poisons is concerned, as well as the observations regarding confirmatory tests and methods of separation, is very considerable and deserves the hearty commendation of all interested.

The external appearance of the work is very creditable; it is printed with clear types upon 668 large octavo pages. The illustrations are contained upon thirteen plates; they are very clear and illustrate the appearance, under the microscope, of the precipitates and crystallizations extremely well. It deserves to be noticed that this part of the work is due to the skill of Mrs. Wormley, who has drawn them from nature and transferred them to steel.

In regard to the scope of the work, the author observes: "It was originally intended to confine the work exclusively to the *chemistry* of poisons, but, in order to adapt it to a larger class of readers, it was finally determined to also consider their physiological and pathological effects, and point out the treatment proper for each." Without intending to find fault with him, we confess that we should have preferred to see the two branches treated in different volumes; both subjects would then appear to still greater advantage, be more connected and comprehensive. We confess, however, that, at home, the *Chemistry af Poisons* would then prob-

ably not have attracted that attention which it merits, but which, we hope, it will receive now both at home and abroad.

The introductory remarks are concluded on page 61; the remainder of the work is divided into two parts,—the inorganic and organic poisons. The first part treats of the alkalies, including ammonia, of the mineral acids, of oxalic and hydrocyanic acids, phosphorus, in connection with which phosphoric acid is noticed, antimony, arsenic, mercury, lead, copper, and zinc. Under the head of vegetable poisons are treated nicotia, conia, opium with its alkaloids, meconic acid and opianyl, nux vomica and its alkaloids, aconitia, atropia, daturia, veratria and solania.

It will be seen that the compass of the work is circumscribed, notwithstanding the author has labored at it since 1857. We miss among the inorganic poisons those corrosive elements iodine and bromine, then baryta, strontia, tin, and other heavy metals. Among the vegetable poisons the following alkaloids are not noticed: delphinia, sanguinarina, emetia, hyoscyamia, colchicia and lobelina, likewise digitalin, picrotoxin and some other compounds. It is to be hoped that the author may find time to continue his researches with them, and embody the results either in a future edition of his work, or in a separate volume.

The material of each article is arranged in about the following order; history, physiological effects, symptoms, treatment, post mortem appearance, chemical nature, special chemical properties (reactions and tests), separation from organic mixtures, quantitative analysis. That portion relating to the action and treatment is of less *direct* interest to the pharmacist; still desirable, if not important for him to know, are the facts in regard to the smallest fatal doses, the rapidity of action, and the proper treatment, which are related with minuteness.

Reading over the chemical portion of the work, we were pleased with the clearness and precision of the descriptions in general, though occasionally a want in this respect may be noticed.

The use of the antiquated term subcarbonate of potash, on page 67, was doubtless accidental and subsequently overlooked, since we have met with it but once, while in all other cases the proper chemical term carbonate, or protocarbonate, is employed. On page 72 it is stated that fused potassa, "when pure, is a white solid, but as *usually* met with in the shops in the form of little sticks, it has a greyish or brownish color." We hope the author may be mistaken, and that even in the far West the purer white compound is kept on hand by pharmacists. On page 95, the *distillation* of liquid organic mixtures at a *moderate heat* is recommended to separate *any* of the ammonia or its *carbonate* present. It is difficult to convey in a few words an idea of the different behaviour in this respect of ammonia and its carbonates. While a greater portion of the alkali is readily obtainable at a *moderate* heat, unless it be very largely diluted, a higher degree of heat is required in case of the carbonates, and it must be increased with the amount of carbonic acid in combination with the alkali.

The statement on page 71 that sulphate of magnesia does not precipitate the carbonate of ammonia, requires qualification, to the effect that in the absence of ammonia salts, salts of magnesia will be precipitated to some extent after some time by the neutral carbonate.

Phosphomolybdate of soda does not precipitate *alkaline* solutions of ammonia (p. 94). On the same page and page 85, it is stated that antimoniate of potassa produces no precipitate with ammonia or its salts; is this positively the case under all circumstances? When testing by this reagent for soda in the presence of ammonia salts, it has been customary to previously destroy the latter (see Fresenius' Qualitative Analysis).

For the separation of poisonous alkaloids, Dr. Wormley considers the methods of Stas, of Rogers and Girdwood, of Uslar and Erdmann, of Graham and Hofmann, and by dialysis. This last process has given very unsatisfactory results in regard to quantity, which is corroborated by several other experimenters. A. T. Machattie stated in 1864 (Chem. News, x. 183) that the results are much more satisfactory if the membrane of the stomach or the intestines is used for the dialytic septum instead of parchment paper. Uslar and Erdmann's process has lately been considerably improved by Dragendorff, in the substitution of pure benzine for amylic alcohol.

For the separation of morphia by Stas' method, acetic ether was proposed instead of ether by A. Valser, in 1862, the alkaloid being more freely soluble in the former liquid.

The tests used for the alkaloids are mostly those of long established value; the solution of bromine in bromhydric acid we believe is a new one, —it is for many alkaloids pretty delicate, but, as the author states, the reaction is common to most of the alkaloids, and many other organic compounds.

A number of reagents which have been proposed during the last ten years, partly for recognizing the alkaloids as a class, partly for distinguishing them, and partly for separating them from organic mixtures, have not been experimented with. We refer particularly to Sonnenschein's phosphomolybdic acid, Scheibler's phospho-tungstic acid, Schultze's pentachloride of antimony and phosphoric acid, Horsley's nitro-prusside of sodium, Delff's platino-cyanide of potassium, and to Helwig's method of sublimation; also to Von Planta's hydrargyro-iodide of potassium, which was modified by Th. B. Groves, and has been used in this modified state by Prof. F. F. Mayer, for the quantitative estimation of the alkaloids as well as for their separation in a pure state, and finally to R. Wagner's method of volumetric estimation of many alkaloids by iodide of potassium. One or two other tests have been recommended so recently that the author could not have examined them for his present work with the same minuteness which characterizes all his researches in the field of micro-chemistry.

Among the many new facts and new suggestions which we met with in our hasty examination of Dr. Wormley's work, the following appears to us

as particularly valuable, not merely in forensic analysis, but more especially for technical purposes: we refer to the detection of minute quantities of *free sulphuric acid* by means of veratria. The liquid is mixed with a little of the alkaloid, heat is applied, and the colorless solution is evaporated to dryness on a water bath, when the residue will have a crimson color more or less intense. The author has detected $\frac{1}{1000}$ grain of sulphuric acid in this way, and even $\frac{1}{5000}$ grain gives to the residue a perceptible red tint. Since no other known acid has the same reaction, neither sulphuric acid in combination, the test will be a valuable one for the detection of sulphuric acid in acid liquids, in which it is frequently used as an adulterating agent (vinegar for instance), or is present as an impurity.

We have devoted so much space to the review of this work, because we hail it as a very important addition to our scientific literature, and as such heartily recommend it to our readers. The author we sincerely wish may find the leisure of extending his researches also in the directions pointed out above, for which, from his past experience, he appears to be eminently qualified. J. M. M.

OBITUARY.

Theophile Jules Pelouze, died on Friday last, the 31st of May, at his country house at Bellevue, close to Sévres. Born the 13th of February, 1807, at Valognes (Département de la Manche), he inherited his love for science and arts from his father, Edmund Pelouze, a man of great practical talents, formerly employed in the manufactory of Gobelins, and afterwards director of the gasworks of the Manby and Wilson Company at Paris. Pelouze the elder is known as the author of a great number of treatises on various branches of applied chemistry—on glass-making, on brick making, on colors and varnish-making, on washing and bleaching for housewives, etc. His treatise on the last-named subjects was published under the name of his wife. His chief work, "On the Manufacture of Gas," was revised by his son, and came out in a second edition as late as 1859.

Young Pelouze entered life as a pharmaceutical chemist; but he was only twenty years old when Gay-Lussac made him his assistant, and published some of his researches conjointly with him. Three years later, in 1839, he became professor of chemistry at Lille. Here he examined the juice of beetroot, and, in conjunction with Kuhlmann, published a paper on its fermentation. From 1831 until 1847 he took the place of Gay-Lussac as Professor of Chemistry at the École Polytechnique, and at about the same time (1831) he was elected to supply the place of Thénard as professor at the Collége de France. Shortly after these elections Pelouze managed to go to Giessen, and to publish joint researches with Liebig on the ether contained in wine, to which they gave the name of œnanthic ether, but which was afterwards proved by Delffs to be identical with pelargonic ether. In 1833 Pelouze became Assayer, and in 1846 Controller (Vérificateur) of the Mint. He was elected a member of the Académie

des Sciences in 1837. Of republican views, and much interested in politics, he became prominent through the revolution of 1848. The provisional government elected him to a place which until then belonged to the nobility or to the chief dignitaries of the state, that of President to the Board of the Mint (Président de la Commission des Monnaies). This position he held until his death. He became successively knight, officer, and commander of the Legion of Honor. His private laboratory for pupils in the Rue Dauphine closed when he opened a laboratory in the mint.

The number of papers published by Pelouze is very great. We can only mention here the most prominent of his researches. Among these none will be better remembered than the investigation recorded in his paper on the transformation of hydrocyanic acid into ammonia and formic acid. This paper was published in 1834, but the importance of his discovery became evident at a much later period, when hydrocyanic acid was first produced from carbon and nitrogen. Then it was that the transformation which Pelouze had effected by treating hydrocyanic with a strong solution of hydrochloric acid attained its remarkable position as the first instance of the synthesis of an organic body from its elements. At the time of the discovery its real importance could not be appreciated, but even then the relation of formic to hydrocyanic acid was of much interest. Next in importance to this memorable paper are several papers on the products of the dry distillation of lactic, malic, and tartaric acids. Pelouze discovered lactic anhydrid and lactid. Maleic and pyrotartaric as well as pyrogallic acid, if not actually discovered were, at least, chiefly studied by him. The salts of lactic acid were likewise examined by Pelouze, and described in several papers, one of which he published conjointly with Gay-Lussac.

A memoir on mustard oil was published by Dumas and Pelouze; another on asparamid (asparagine) and asparamic acid by Pelouze and Bourton, and a joint research on curarine was published by Pelouze and Claude Bernard. In mineral chemistry nitrosulphuric acid constitutes his chief discovery. In applied science numerous contributions, particularly on fulminates and the manufacture of percussion-caps, and above all on glass, were published by him at various intervals. Pelouze had an interest in large glass works at St. Gobin, and his last communication made to the Academy, some months ago, treated on the subject of this manufacture. A treatise on chemistry in five volumes by Pelouze and Fremy has seen three editions, the last of which was published in 1866. All these publications, if they do not place him among the very first French savants, will preserve his name permanently in the history of science. His great kindness of heart, and sincere and active interest for his pupils, will not easily be forgotten. There are and have been witnesses to these genial qualities in England. Professor Crace Calvert and the late Mr. Stoikowitch were assistants to Mr. Pelouze. During the last year important researches on aniline colors were carried on in his laboratory by MM. Girard, de Laire, and Chapoteaut.—*The Laboratory*, i, 182, June 8, 1867.